2013

Understanding and disrupting institutional settings: using networks of conversations to re-imagine future farming lives

Robert Campbell

Edith Cowan University

Recommended Citation

This Thesis is posted at Research Online.
https://ro.ecu.edu.au/theses/603
You may print or download ONE copy of this document for the purpose of your own research or study.

The University does not authorize you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following:

- Copyright owners are entitled to take legal action against persons who infringe their copyright.

- A reproduction of material that is protected by copyright may be a copyright infringement. Where the reproduction of such material is done without attribution of authorship, with false attribution of authorship or the authorship is treated in a derogatory manner, this may be a breach of the author’s moral rights contained in Part IX of the Copyright Act 1968 (Cth).

- Courts have the power to impose a wide range of civil and criminal sanctions for infringement of copyright, infringement of moral rights and other offences under the Copyright Act 1968 (Cth). Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.
Understanding and disrupting institutional settings: using networks of conversations to re-imagine future farming lives

Robert Campbell

Submitted in partial fulfilment of the degree of Master of Environmental Management

June 2013
Abstract

Farmers in Australia and elsewhere face the challenge of remaining profitable whilst dealing with adverse structural arrangements and public expectations to better manage environmental degradation. This thesis draws on arguments that dominant paradigms in agricultural science and environmental management have often been ineffective in addressing these apparently competing demands and appear poorly suited to ‘messy’ situations characterized by uncertainty and complexity, and in which diverse stakeholders are motivated by varying goals and values. Engaging with such situations requires a philosophy and methodology that accepts a multiplicity of perspectives and which seeks to learn about and reflect upon novel ways of thinking and acting. Among the underlying ideas that have shaped this project is the importance of recognising the assumptions and commitments that researchers bring to their practice in order that traditions are not uncritically reproduced and that the products of our thinking are not reified. Regarding farming as less a set of technical practices and more as a human activity taking place within broader economic, social, cultural and ecological contexts, I sought to engage a group of farmers in southern Western Australia in a process of taking action to address an issue of common concern that would help them to live and farm well in their district. My role as both researcher and facilitator of conversations was driven by a commitment to dialogue as a process of meaning making and relationship building. Together we explored some of the broader contexts within which the narrower conceptions of economic and ecological problems are often uncritically placed. Taking concrete action together however proved beyond the scope of my research. The challenge of feeding ourselves while better caring for the land and each other will require imaginative as well as technical resources. To this end I have also sought to sketch out some of the creative possibilities contained within the health metaphor as it is applied to soil, arguing that its use as a proxy for quality or condition fails to utilize its disruptive potential.
Acknowledgements

I owe an enormous debt of gratitude to the eight famers in the Gairdner district in Western Australia’s south who agreed to become my co-researchers. They have shown me considerable hospitality, provided me with a wealth of rich material and have been patient and generous with their time and energy – thank you all. My supervisor Professor Pierre Horwitz has shown similar patience with my haphazard and meandering interests and enthusiasms. He has expressed great faith in my work and my abilities through times when I have seriously doubted them. He has also shared and seemingly appreciated my sense of humour and helped me to deal with the exasperating and the absurd, not to mention shouting me beers and providing me with helpful comments on my writing and thinking – many thanks Pierre. Thanks also to my friends and family, in particular to my blessed mother Diane for her unstinting love and support, and to those who knew not to ask when I would be submitting my thesis. Many other people provided help along the way: in particular I need to thank Ray Ison for the time and interest he took to reply to my many questions. His influence will be clear to any who read further. Thanks also to Rosalind Armson for her comments on a draft chapter; to Professor Matthew Tonts for several helpful conversations and reading recommendations; to Greg Brennan for expressing real interest in my work and pointing me towards some useful ideas; and to Valerie Brown for the experience of attending one of her workshops. My thanks also go the Centre for Ecosystem Management at Edith Cowan University (ECU) and to the South Coast Regional Initiative Planning Team (SCRIPT) who provided funds for my research and travel to conferences in Melbourne and Finland. I would also like to thank the staff and my fellow postgrads at ECU, in particular to Adrianne Kinnear and especially to May Carter for her great help on a trip to Bremer Bay, which she seemed to enjoy. Many other people in and around the Gairdner district provide me with great help: thank you to Nathan McQuoid and to Samantha Rayner and the rest of the staff at the Fitzgerald Biosphere Group (FBG). To any I may have left off this list, my thanks and apologies.
Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher degree or diploma in any institution of higher education;
(ii) contain any material previously published or written by another person except where due reference is made in the text of this thesis;
(iii) contain any defamatory material, or
(iv) contain any data that has not been collected in a manner consistent with ethics approval.

The Ethics Committee may refer any incidents involving requests for ethics approval after data collection to the relevant Faculty for action.

Signed by ......................................................, on this day
USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.
# Table of contents

Abstract .......................................................................................................................... ii
Acknowledgements ......................................................................................................... iii
Introduction ..................................................................................................................... 1
  What’s this about? ............................................................................................................. 3
  Writing this thesis ........................................................................................................... 5
Chapter 1: Getting started .............................................................................................. 9
  The researcher as observer or conspirator? ................................................................. 10
  The roots of productionism .......................................................................................... 13
  Positivist science and instrumentalism ......................................................................... 15
  Naive economic utilitarianism ....................................................................................... 16
  The co-construction of knowledge ............................................................................... 17
  Language and metaphor ............................................................................................... 19
  Thought and language ................................................................................................. 21
  Power and language ...................................................................................................... 23
Chapter 2: A model of research .................................................................................... 25
  A model of research ....................................................................................................... 25
  Area of application ....................................................................................................... 27
  Complex ‘social-ecological’ systems ............................................................................ 29
  Human systems are different ....................................................................................... 31
  First and second order traditions .............................................................................. 32
  Emotioning and affect ................................................................................................... 34
  Appreciative systems .................................................................................................... 35
  Systems traditions ....................................................................................................... 38
  Rhetorical-responsive social constructionism .............................................................. 41
  Agricultural and research ethics ................................................................................... 43
Chapter 3: Methodological traditions .......................................................................... 46
  Developing a methodology ........................................................................................... 47
  Action research ............................................................................................................ 49
  Critical action research ............................................................................................... 50
  Relationships ............................................................................................................... 54
  Knowledge creation ..................................................................................................... 55
  Soft Systems Methodology ......................................................................................... 57
Concluding remarks........................................................................................................................................175
Conclusions..................................................................................................................................................176
References....................................................................................................................................................181
Appendices ..................................................................................................................................................195
  Appendix 1: Study site ..............................................................................................................................195
  Appendix 2: Models from interviews .......................................................................................................198
Introduction

I have been interested in the way we farm and manage the land for most of my adult life. From a relatively early age I had a clear idea where our food came from, having watched my grandfather killing and butchering sheep. The ways in which we grow and consume our food, it seems to me, reveal much about our relationship to the land and to each other. During my lifetime farming and agriculture have faced numerous crises concerning food safety scandals and environmental degradation. Such pressures seem certain to continue as world demand for food increases while farmers and governments are held to account by consumers eager to know that their bellies are not filled at the expense of nature or another’s welfare. Part of the fascination for those involved in addressing the evolving demands of farmers and consumers I believe, is that they present ‘problems’ or rather ‘situations’ that are at once technical and moral. As is becoming increasingly clear for researchers and authorities, land management issues defy neat solutions achieved by technological improvements or better regulation.

Farming and agriculture have played a central role in the economic and social history of Australia from the time of European settlement. Initially wool and then wheat have been industries actively supported by governments to provide not only income and employment, but as a virtuous undertaking in and of itself. The powerful influence of an ideology of developmentalism and a belief in the superiority of rural life combined to fuel a spectacular increase in the area under wheat production in Western Australia (WA), from just over 200 000 acres in 1900, to more than 4 500 000 acres by 1930 (Beresford, Bekle, Phillips, & Mulcock, 2001). Despite evidence of clearing having induced secondary salinity and a sharp fall in wheat prices by the 1920’s, the WA wheatbelt continued to expand up until the 1970’s. Agriculture may have lost some

---

1 The ‘wheatbelt’ refers to the grain growing region in the south-western part of the state of Western Australia (WA), stretching from around Geraldton in the north, to the town of Esperance in the south east, a distance of around 1000 kilometres.
of its economic importance but Australia remains an agricultural nation, with more than half\(^2\) of the land area devoted to some form of primary production (ABS, 2012).

The establishment of agriculture in WA, and throughout the country, has resulted in dramatic changes to the landscape, ecology and people of the region. Attempting to replicate European farming techniques in such an environment, with little understanding of Aboriginal land management techniques, has been at times catastrophic. The difficulties have been exacerbated by Australia’s climatic and geological history, which has resulted in a largely arid continent with thin soils that are very susceptible to various forms of degradation (White, 1997). Declining soil carbon, increasing acidification and the impacts of climate change are identified in the 2011 State of the Environment Report as major risks to the future of agriculture. Further challenges recognized include the inadequate investment in monitoring and management, uncertainty over the most appropriate governance and institutional arrangement for land management and a ‘serious capacity gap’ in the required professions (SoE, 2011).

Ironically, against a backdrop over the last several years of the closures of several large farming and food processing operations, crisis meetings of grain farmers in the south-west WA and the ongoing concern of dairy farmers that the supermarket price wars are threatening the long term supply of locally produced fresh milk, some business leaders and politicians are talking up food production in Australia’s north as the next boom (Kitney, 2013)\(^3\). Feeding into this talk are predictions of future world food demand, amplified by the growth of affluent populations in neighbouring Asian nations. Increasing world food production however is only part of the challenge. Foley et al. (2011) argue that meeting future food needs while at the same time reducing the associated environmental harm is one of the greatest challenges we face this century. Not only must we roughly double food supply within a few decades, at a

---

\(^2\) According to the ABS, the total area of agricultural land in 2011 was 410 million hectares, 53% of Australia’s landmass.

\(^3\) The broadsheet newspaper The Australian has been a prominent supporter of the northern food bowl idea and is also a sponsor and host of the Global Food Forum, a ‘landmark’ conference exploring the potential for agricultural expansion in northern Australia [http://www.theaustralian.com.au/business/in-depth/global-food-forum].
time when yield increases have significantly slowed, but distribution and access\textsuperscript{4} must also be improved if more of the world’s hungry are to be fed. In addition, Foley et al. identify other goals of improving the resilience of our food systems, reducing greenhouse gas emissions, reducing the loss of biodiversity\textsuperscript{5} and addressing water pollution and unsustainable levels of water use. While concerned with the more technical aspects of these challenges, the authors recognize the need for a ‘richer discussion of associated social, economic and cultural issues’ (ibid., p. 337). And it is these aspects of agriculture and farming that became my interest.

**What’s this about?**

My initial proposal for this research was to work with a group of farmers to improve their understanding and monitoring of soil health. I planned to interview a number of farmers using a set of questions that had been used by Lobry de Bruyn and Abbey (1999) in their study of ‘farmers’ soil sense’ and to develop appropriate tools that would enable them to build on their understandings. However as I read more widely and critically and began talking to farmers I felt compelled to make a significant change that would re-configure my relationship to those I was planning to work with. What had started as a project framed by my interest in soil health became a more collaborative inquiry driven by the interests of my co-researchers. Focusing on the processes of communication and the co-generation of knowledge I sought to give my co-researchers the power to determine what was important and relevant to them as subjects of learning and action. I wanted to know what they thought was worth

\textsuperscript{4} I have seen firsthand the impact that inadequate systems of storage, access and distribution can have in communities subject to food insecurity. In southern Malawi, where unsealed roads turn to rivers of mud in the wet season and where government run storage facilities have not been maintained, the construction of a local grain storage building funded by a European development agency made an enormous contribution to ensuring the year round supply of maize in a region that regularly experiences a hunger gap of several months. To survive this gap people will sell their bicycle or radio, valuable means of transport and communication, or resort to theft. One night as I slept, thieves stole the drying beans that were growing up the maize stalks in the adjoining field.

\textsuperscript{5} Hobbs and Cramer warn that the fragmentation of vegetation and disruption of hydrological patterns as a result of farming in south-west Western Australia, a recognized region of very high biodiversity, may ‘lead to one of the highest degrees of biodiversity loss and change anywhere in the world in coming decades’ (Hobbs & Cramer, 2003, p.371).
changing in their lives as farmers in the Gairdner\textsuperscript{6} district and to do that required a change in my approach.

This thesis might most easily be described as a critical participatory action research (CPAR) thesis, although other traditions and methodologies have been important influences. CPAR emerged as a desirable approach because it addressed my concern that technical-scientific approaches in agricultural science and environmental management are not only often ineffective but as a researcher, such approaches are also unappealing. The lack of appeal is the result of a narrow adherence to a biophysical framing of situations that regards values, beliefs and other fundamental aspects of being human, with suspicion. My interest in CPAR came about because, like Maguire (cited in, Herr & Anderson, 2005, p. 72), I was ‘looking for ways to make my dissertation research more congruent with my beliefs about empowerment and social justice’. It became clear too that to remove myself from the act of questioning, as recommended by most positivist research traditions, while simultaneously inquiring into the lives of others, would be absurd. Action researchers such as Ray Ison and David Russell (2000), and Richard Bawden (1991), demand that the researcher not only recognize their own role in constructing and framing ‘situations’ of interest, but also take responsibility for the choices made in the course of their practice (see also Herr & Anderson, 2005). These authors, along with many others, regard the researcher’s own practice as a legitimate subject of inquiry and also understand the need, as Lloyd Fell (2000, p. 505) puts it, for a connection with ‘the heart as well as the head’. Equally appealing is the underlying notion of constructionism as an epistemological basis of research. Adherence to the idea of objective truth, particularly when looking at lives-in-action, seems to me not only hopelessly elusive but oppressively restrictive. A constructionist perspective, when coupled with an awareness of the act of construction, permits far greater freedom to be creative and disruptive, invaluable qualities for dealing with the messy and the seemingly intractable.

\textsuperscript{6} For details of the study site see appendix one.
Writing this thesis

It may be considered an advantage of many scientific disciplines that there are well established methodologies for conducting research and equally well established formats for writing it up. Operating within such a tradition not only provides the researcher with a clear process to follow but also provides a degree of authority to the findings. A comfortably prescribed tradition however can readily act as a straitjacket. Of course the tradition also sets certain standards of practice by which a researcher can be held accountable.

Greenwood and Levin (2007) set high standards for the action researcher as a writer and practitioner. Writing AR they argue must convey the changing perspectives and experiential learning cycles undertaken by the stakeholders involved while demonstrating the skills of being scientific, counterintuitive and technically competent – connecting local understanding with theory and analysing the contribution of power relations and ideology. The most promising approach to meet these demands they suggest is that of the narrative. Narratives provide a form that is able to connect theory and practice, the particular and the more general while remaining ‘scientifically powerful’ (ibid., p. 110).

Dick (1993) strikes a somewhat defensive tone in his advice to the author of an action research thesis: recommending the provision of ‘compelling justifications’ for the approach and suggesting that your thesis will also be longer and more difficult to research. Greenwood and Levin though seek to embolden the action researcher: noting that while the experience may be ‘exhausting and enervating’ and the results subject to events beyond the researchers’ control, there is no need to be apologetic about any perceived shortcomings of your project. AR projects are by their nature complex and long-term and little research of any kind, they suggest, lives up to its ideals.

This thesis has been written over a number of years, during which time my interests, enthusiasms and perspectives have unavoidably changed. At times I have been deeply concerned with thinking about how this thesis should be written, if not equally
concerned with writing it, while at others I have simply written about what seems at the time to be interesting. The simplest vision I had of its form is akin to a ponytail: a spiralling progression, braiding together action and reflection with relevant literature. Looking at the arrangement of chapters it might seem there is an excessive interest in the theoretical and methodological. From my perspective the first three chapters provide the necessary context to my thoughts and actions in the field. The project underwent a significant shift in approach in terms of the relationship I wanted to establish with my co-researchers, motivated by my desire that we identify issues of interest not to me, but to those farmers who agreed to be a part of the research. This approach stemmed from my engagement with a body of critical literature dealing with models of agricultural research and their underlying philosophy, theories of communication, language, cognition and learning, and a variety of methodologies that sought to address critiques of the positivist inspired research that remains so influential within many branches of science. To do justice to these ‘marginal’ traditions and their influence on my work, and because I found many of these ideas to be exciting, powerful, daunting and liberating, I have devoted three chapters to them.

In chapter one I make the case for an explicit need of a philosophical basis for any research, recognizing the active role played by the researcher and the set of ideas and beliefs they operate within. I describe the development of productionism as the dominant paradigm of agricultural research and discuss the contribution of positivism, utilitarianism and mutual construction to influential traditions of prediction and control in the natural and social sciences. The chapter concludes with a discussion of language and metaphor as underappreciated aspects of scientific practice.

Chapter two outlines a model for the conduct of research that recognizes the importance of the researchers’ framework of ideas and discusses some of those that make up my framework: namely ideas around communication, emotioning, appreciative systems, constructionism and ethics. The first two chapters provide a useful foundation for the discussion of methodology that follows.
I write about methodology in chapter three as much or more as a theory of methods than as a set of methods and tools. This chapter is structured around a diagram that identifies influential methodological traditions and intellectual foundations, some of which have been touched on in chapters one and two, together with my intent and the values that informed my practice.

I adopt a more obviously narrative style in chapter four where I tell the story of the work done with my eight co-researchers and our attempts to share and develop our understandings of the situations in which they live and work, and which we hoped to improve by identifying values, goals and concerns that might lead to action. I describe the processes we undertook to learn together and to develop relationships of trust and respect, and the sometimes faltering steps I took to maintain conversations and to keep the project moving forward.

In chapter five I discuss a number of topics that arose in our conversations and which concern my co-researchers’ relationships with various institutions and organizations. These relationships reveal tensions and at times stark differences in values and ways of knowing that are underpinned by uneven power relations. My aim is to draw attention to the range of perspectives and values that can be found within the broader agricultural industry and to outline some of the consequences of dominant approaches to agricultural science and policy.

The last chapter returns to the subject that I began with. While my initial concern with soil health gave way to considerations of the values that I wanted to inform my research, my interest in soils and the concept of soil health remained. In chapter six I review the soil health concept through the prism of the health metaphor, arguing that the creative and disruptive potential of soil health is being overlooked by the widespread use of ‘health’ as a proxy for a series of quantitative and largely physico-chemical indicators.

In the early stages of this project my concern with soil health focussed on how to make the concept practically useful to farmers as a tool to improve their monitoring and understanding. Over time I became less interested in the ‘mechanics’ of soil
health as a tool and more interested in the way that soil health has been framed and
the health metaphor recognized, or not, as a way of unearthing the assumptions and
values that animate its application and conception. This change in perspective
concerning how I regarded soil health as a subject seems to parallel the change in
perspective I experienced in what my research should be doing and what my role
should be.

What began as an attempt to operationalize soil health as a useful tool for farmers
became, in part at least, an extended reflection on the role of the researcher as one
who maintains and promotes particular understandings and ways of knowing. In
becoming aware of the responsibility I needed to take for my beliefs and values and
their influence on my practice as a researcher, it became clear to me that my role in
this project needed to change. Putting my interest in soil health to one side I adopted
the role of the facilitator of a small group of farmers to identify an aspect of their
farming lives that could be changed for the better.

There are two important themes that run through this thesis. The first is that the
process of inquiry is powerfully shaped by the researcher’s beliefs, ideas and values
and that responsibility must be taken for them. In the first three chapters I describe
the beliefs, ideas and values that have shaped my research and identify the traditions
that I have worked within and chosen to reproduce. These chapters describe the
theoretical foundations for the processes of engagement that are the subject of
chapters four to six while also providing the basis for an evaluation of whether I have
met the goals and standards of my espoused practice. The second theme concerns the
ways in which institutionalized practices in agricultural research and policy have
promoted certain understandings, perspectives and languages over others. Chapters
four to six describe different aspects of my engagement with my co-researchers and
with the literature and our attempts to create together our own understandings of
what it means to be farming, and researching, in this particular time and place.
Conversation is employed as a means of both generating meaning and understanding
and as a means of re-imagining possible futures.
Chapter 1: Getting started

The central argument I want to outline in this chapter is that all research takes place within particular traditions and that these traditions are maintained and reproduced through particular beliefs, relationships and languages that become institutionalized. The researcher who fails to take responsibility for his or her beliefs and commitments is in danger of unwittingly reproducing them without an appreciation of the implications for their work of not acknowledging the philosophical context in which the work is created. It is not enough that a researcher claim to be describing the truth for philosophical and biological investigations have made clear the active role we play in constructing and reconstructing truth and meaning.

An institution in this sense is distinct from the idea of an institution as an organization: it refers instead to various constraints, formal or informal, which are devised to shape human interactions (North, cited in Ison & Russell, 2000). In his introduction to Language and symbolic power (Bourdieu & Thompson, 1991), Thompson cites Bourdieu’s definition of an institution as any relatively durable set of social relations which endows individuals with power, status and resources. It follows then that no form of inquiry is possible without an observer who acts in accordance with particular ideas and beliefs. By their nature such institutionalized practices and philosophies are often unacknowledged, covered up by a commitment to objectivity and the principle of the researcher as disinterested observer. In acknowledging and uncovering such commitments, new opportunities arise for alternative understandings and forms of inquiry. I want here to take a look at how traditions operate with a view to making clear the traditions that have informed my own work. In particular I want to look at the commitments and assumptions that have prevailed within the productionist paradigm and which have been so influential in agricultural research.

Such a critical approach to the practice of inquiry is by no means exclusive to the sciences. The historian E. H. Carr (1964) takes a critical view of those nineteenth

---

Woodhill (2010, p. 52), in his critical analysis of the role of institutions in ‘social change-focused development’ takes a deliberately broad perspective of institutions to include ‘organizations and regular patterns of behaviour alongside the more narrow view of institutions as merely “rules”’. 
century British historians who, comfortable within the milieu of laissez-faire economics, felt it unnecessary to delve too deeply into the practice of writing history. Carr explains that:

The facts of history were themselves a demonstration of the supreme fact of a beneficent and apparently infinite progress towards higher things. This was the age of innocence, and historians walked in the Garden of Eden, without a scrap of philosophy to cover them, naked and unashamed before the god of history. Since then, we have known Sin and experienced a Fall; and those historians who today pretend to dispense with a philosophy of history are merely trying, vainly and self-consciously, like members of a nudist colony, to recreate the Garden of Eden in their garden suburb. Today the awkward questions can no longer be evaded (ibid., p. 20).

The researcher as observer or conspirator?

In contrast to the objectivist notion - dominant within the sciences for most of the period since Descartes - that ‘truth and meaning reside in their objects independently of any consciousness’ (Crotty, 1998, p.42), there exists a tradition within a variety of disciplines, including philosophy and second-order cybernetics, which rejects the idea of a neat separation of observer and observed. Heinz von Foerster (1992) points to the ‘abyss’ that separates alternative visions of our relationship to the world by posing the question:

Am I apart from the universe? That is, whenever I look I am looking as through a peephole upon an unfolding universe.

Or:

Am I part of the universe? That is, whenever I act, I am changing myself and the universe as well.

...

Either to see myself as a citizen of an independent universe, whose regularities, rules and customs I may eventually discover, or to see myself as the participant of a conspiracy, whose customs, rules and regulations we are now inventing\(^8\). (von Foerster, 1992, p.15)

\(^8\) I was first introduced to von Foerster in Ison and Russell (2000, p.5) where this quote also appears.
Our response has profound implications for our actions in the world. The independent observer, in possession of certain knowledge, is in a position to tell others how to act and to postulate moral codes. The origin of ethics von Foerster suggests, lies with those who regard themselves as interdependent, as ‘participants’ in the universe, who are able only to tell themselves how to think and to act.

Humberto Maturana (1988) reveals further entailments in the objectivist position, according to which there exists a ‘single domain of reality’ to which all phenomena can be reduced. The objectivist ‘explanatory path’ carries with it a claim to ‘privileged access to an objective reality’, which appears to absolve the observer from responsibility for their rejection of alternative explanations or perspectives. Within the objectivist explanatory path then ‘a claim of knowledge is a demand for obedience’ (ibid., p.29). Both von Foerster and Maturana reveal an element of coercion associated with objectivism, connected to a sense of certainty and a faith in an ultimate truth from which the observer remains at arm’s length. With this distance comes a comforting denial of responsibility for one’s actions and beliefs that is part of the attractiveness of objectivism as a research position (von Foerster, 1992).

Science is ultimately a creative act. The process of creating a work of science requires the scientist to make a host of choices regarding what is to be inquired into, how the inquiry will be conducted, and what the result of his or her labours might mean. While at pains to outline what he regards as important differences between the conduct of science and history, Carr (1964) presents a compelling description of the ‘making’ of history that might equally apply to the scientist. Given that the historian (and the scientist) writes his or her history from within a particular tradition, Carr suggests that ‘our first concern’ lies not with the facts as such but with the historian. Carr (ibid., p.23) provides the sage advice that when reading history; ‘always listen out for the buzzing. If you can detect none, either you are tone deaf or your historian is a dull dog.’ Not only is it impossible then to create a work of history or science without

---

9 I should point out that Carr’s concept of science, with which he compares the practice of making history, follows more closely objectivist traditions and bears little resemblance to the concept or tradition of science I have chosen to work within.

10 Citing Oakeshott, history ‘is the historian’s experience, it is ‘made’ by nobody save the historian: to write history is the only way of making it’ (Carr, 1964, p.22).
some bias or some point of view, it is a necessary condition for the creation of an engaging piece of work. Carr goes on to describe the ‘facts’ in a work of history as being

like fish swimming about in a vast and sometimes inaccessible ocean; and what the historian catches will depend, partly on chance, but mainly on what part of the ocean he chooses to fish in and what tackle he chooses to use – these two facts being, of course determined by the kind of fish he wants to catch. By and large, the historian will get the kind of fish be wants (emphasis added) (ibid., p.23).

The concept of a tradition emphasizes the historicity of our research practices and ways of thinking. And while providing a vital function within cultures by ‘embedding’ and preserving useful practices, they may also become so entrenched that they exclude critical reflection. Agricultural research and development (R&D) has become one such tradition argue Ray Ison and David Russell (2000, p. 1), having ‘evolved into blind practice as a consequence of the loss of connectedness with its context, the very connectedness that gave meaning ... in the first place’ (see also Ison, 2005).

It is precisely this uncritical reproduction of entrenched practices that both arise from and legitimize underlying assumptions, which give traditions their persistence. Traditions, according to this argument, do not represent expressions of some ‘natural’ state of affairs; the continuance of traditions requires that they are ‘sustained in existence by the efforts of those involved in them’ (Shotter, 1993, p.178). Foucault reveals some of the nature of this self-nurturing process, describing established discourses as ‘practices that systematically form the objects of which they speak’ (cited in ibid., p.20). Traditions are thus reproduced, often unknowingly, through an acceptance or commitment to particular ways of thinking, acting and talking. What all these authors make apparent are the profound intellectual and ethical implications of the approaches we take and the decisions we make as researchers. I want to argue, as Carr has above, that such decisions and their implications should be made apparent.

Among the assumptions I have brought to this project is the belief that the ‘problem of agriculture’ is not essentially technical in nature; rather the central concern might be more usefully thought of as being social and cultural in nature. Addressing what is
often portrayed as an ‘environmental crisis’, Woodhill and Röling (1998, p.46) argue that the issue does not lie within the ‘environment’ as such, rather it ‘needs to be understood in terms of competing values, beliefs, perceptions and political positions. It has to do with our “way of life” and how we understand, explain and create our existence’ [emphasis added]. For Ison (2005, p.23) the ‘crisis’ in resource management ‘is a crisis of how we claim to know what we know’. The suggestion is not that there is no place for technical and scientific endeavours in agriculture or environmental management, rather that science alone is insufficient to adequately address our resource management crises (Bocking, 2004).

The roots of productionism

While the proximate causes then of the ‘agricultural problematique’ might lie within the reductionist and technical approach to agricultural R&D (Hodges & Scofield, 1983), the ultimate cause might be found within dominant paradigms relating to problem-solving and conceptions of the common good. It might be useful then to examine the assumptions and worldviews that inform the productionist paradigm that has dominated so much of agricultural R&D.

The weed scientist and agricultural ethicist Robert Zimdahl (1998b, p. 77) provides a succinct statement of the goals and reach of productionism when he writes that ‘I and my colleagues have accepted, unquestioningly, that production and profit are and ought to be the primary values in agriculture’11. Paul B. Thompson (1995) pursues the heritage of productionism through various Protestant doctrines such as the myth of the garden, together with utilitarian concerns over resource scarcity that were prevalent in a rapidly expanding seventeenth century Europe. Drawing on the work of Weber, Thompson argues that ideas such as ‘God helps those who help themselves’, contributed to the development of capitalism and the emergence of industrial agriculture. The oft cited Protestant work ethic then enables the conversion of ‘production into a sign of the farmer’s moral worth’ (ibid., p.68) and a corresponding belief in idleness as a sin.

11 Zimdahl’s writing on agricultural ethics and the argument that there is a lack of critical reflection within much agricultural research is addressed in the following chapter.
Production as a virtue was compounded by the idea that fertile land was considered as a gift from God, which meant that constraining one’s productivity was effectively a refusal of God’s grace. For Thompson, the most important and perhaps most enduring legacy remains the ‘myth of the garden’, which draws upon one of the central tenets of Christianity, that of God’s choice of the Garden of Eden as a suitable home for humanity. Tending the garden, that is, transforming the landscape, is God’s work, and the garden metaphor Thompson argues, helps pit productionism against many of the goals of contemporary environmentalism (ibid., p.58).

Aspects of productionism were also important in the emergence of capitalism: a novel set of social and economic relations that first arose in English agricultural communities in the seventeenth century. In The origin of capitalism Ellen Meiksins Wood (2002, p. 94) argues that far from being a natural progression from earlier systems of barter and exchange, capitalism arose from a specific set of property relations unique to the English countryside that produced an entirely new set of market ‘imperatives’. These included ‘a relentless compulsion to compete ... to maximize profit ... and systematically to increase labour-productivity’. The drive for ever increasing productivity was encapsulated in the ethic of ‘improvement’, which became a central concern of the Royal Society and prominent scientists and thinkers of the time such as John Locke. As Meiksins Wood (ibid., p.106) points out the word ‘improve’, now understood as ‘to make better’, meant literally ‘to do something for monetary profit’. Improvement brought with it not simply new technologies and farming methods but larger and more concentrated landholdings and the elimination of old customs such as grazing on common lands. The writing of Locke typified the improvers’ divine justification for productive use of ‘waste’ land: ‘God gave the World to Men in Common ... it cannot be supposed he meant it should always remain common and uncultivated. He gave it to the use of the Industrious and Rational’ (cited in Wood, 1984, p. 57)12.

These ideas were very influential at a time when resource scarcity in Europe was helping to fuel colonial expansion. Emigrants set off to the new world well-armed

---

12 See also John Locke and agrarian capitalism (Wood, 1984).
with a combination of ‘civil, religious and mercantile aspirations’ (Thompson, 1995, p.52), a powerful set of mutually reinforcing values if ever there was. Several centuries later a similar combination of ideals was at work in the founding of the wheatbelt in Western Australia (WA). The clearing of millions of hectares of native woodland to establish a grain growing industry was underwritten by successive state governments, eager to ensure the future prosperity of the state following the collapse in earnings from gold mining. The project drew strength from the widely held view that farming was a virtuous and worthy undertaking, a superior lifestyle which rendered the farmer ‘more deserving than the parasites in the city’ (Beresford et al., 2001, p.42).

**Positivist science and instrumentalism**

If these Christian and capitalist concepts provide the socio-cultural background to the development of productionism, it is the influence of ‘two discredited dogmas: positivist science and naive economic utilitarianism’ that Thompson (1995, p. 60) argues have led to productionism’s largely uncritical acceptance. Positivist science asserts both the independence of the observer from the observed, and the idea that its practice is value free. As Thompson puts it, this last idea is ‘amusingly self-contradictory’ since it qualifies as a norm in its own right.

It would be wrong however to conceive of positivism as a unified position. Oliga (1988, p.95), drawing on the work of Keat, identifies at least four positivist doctrines; the second of which, ‘the positivist conception of science’, is perhaps most relevant here. This doctrine specifies scientific knowledge as constituting ‘the explanation and prediction of observable phenomena through the demonstration that such phenomena constitute instances of universal laws that remain invariant in all regions of space and time’ (emphasis added) (ibid., p.95). Within this doctrine Keat distinguishes ‘realist’ from ‘instrumentalist’ positions, and it is instrumentalism that has driven science as it is conceived within agricultural R&D and environmental management more broadly. Instrumentalism regards science as a tool for a particular purpose, in this case, of prediction and control.

---

13 Burkhardt (1986, p. 30) makes a similar argument in suggesting that ‘Scientism’, defined as a ‘belief in the goodness of scientific progress’, and utilitarianism are the dominant values within agricultural research.
Woodhill and Röling (1998) identify instrumental reasoning as one of two features of modernity which have shaped dominant modes of environmental management. Instrumental reasoning draws on the ‘perceived power of science and technology’ to provide for human needs. Aspects of instrumental reasoning pertinent to this thesis include the assumption of ‘linear cause-and-effect relationships between phenomena’, the adoption of linear and highly structured problem solving approaches, a focus on ‘the achievement of specific and quantifiable technical or material outcomes’, and the separation of knowledge from values and political power. Together, these lead to the application of scientific knowledge with scant regard for its ethical implications (ibid., pp.50-51).

**Naive economic utilitarianism**

Thompson’s (1995, p.64) case for the role of economic utilitarianism draws on the influence of John Stuart Mill and his argument for science ‘as an instrument for producing social benefits’ 14. The importance of the production of social benefits has been particularly potent within agricultural science where the costs of failure are potentially very high (as they are in medical science), and where the connection between productivity and social benefit is easily made. Thompson summarizes the foundations of naive economic utilitarianism in three points.

The first of these is that all preferences are regarded as being equal; naive economic utilitarianism has nothing to say about ends: what counts is the satisfaction of preferences, leaving the means of preference satisfaction as the major concern. It is this concern with satisfaction and efficiency that provides a strong link with productionism and the role of technology in overcoming readily definable ‘problems’.

The second implication is that the maximisation of preferences is subject to the total amount of goods available. Hence the attractiveness of yield-enhancing technologies that make the pie bigger for all. Finally, the test of the value of any technological innovation lies in its adoption, with many farmers effectively being forced to adopt

---

14 Thompson acknowledges that while Mill was influential in establishing a utilitarian doctrine, Mill himself developed a theory of utilitarianism more complex than that outlined above. Thompson makes the same argument in regards to theories of positivism.
yield-enhancing technologies that satisfy consumer preferences by keeping the price of foodstuffs low. In summary, the naive utilitarian views the overriding goal of agriculture to be the production of food and fibre for our consumption, and the nature of any ‘problems’ associated with agriculture to be concerned with their availability and cost. What is particularly important to note in this analysis, Thompson (ibid., p.67) argues, is the way in which ‘the traditional sources of the production ethic conspire with positivism and naive economic utilitarianism to produce a productionist ethic in agriculture’. It is the combination of institutionalized practices and policies that has led to the entrenchment of productionism, such that:

The cumulative effect of these themes is an industrial agriculture for which the goal of making two blades grow where one grew before is never questioned, where those who succeed at this quest are bestowed with honours, and where those who fail to take it up are regarded with puzzlement (ibid, p.67).

The co-construction of knowledge

I want at this point to add to the argument that has been made on several occasions throughout this chapter: that scientific practices (or other forms of inquiry) are intimately connected with and embedded in a complimentary culture. As Thompson makes clear above, technical-scientific approaches to agricultural science have developed from within a set of enabling beliefs regarding the proper goals of science and public policy. Shackley, Wynne and Waterton (1996, p.208) build on this argument to suggest that the ‘social’ and the ‘scientific’ are ‘constructed concurrently’ in such a way that they ‘have the necessary effect of bolstering up one another’, with the result that they each appear as ‘apparently independent wholes’. ‘Hence’, they write,

15 The provision of plentiful low-cost food owes as much or more to explicit government policy as it does to farmers’ capacity to produce ever higher yields. Under the new deal policies of Roosevelt cheap and abundant food for wage earners as part of an expanding consumer economy was encapsulated in the idea of a ‘chicken in every pot’ (Goodman & Redclift, 1991).

16 This has occurred, Thompson (1995, p.67) argues ‘despite the fallacies and non sequiturs’ in the principal claims. These include the undersupply of non-market goods such as soil conservation, food safety and nutritional quality, which require (government) intervention. There is also the failure to acknowledge that maximising productivity is fundamentally uneconomic, when the marginal costs of increasing production outstrips the marginal returns.
The once powerful social science belief in consistent and unambiguous preferences, identity and interests supported the concept of elaborate sociotechnical systems ... However, the power of such social science beliefs derived partially from the natural scientific and technical understanding that such systems were subject to precise and reliable deterministic scientific laws, which allowed the possibility of their prediction and control. (ibid, p.208)

This process of mutual construction helps create the intellectual foundation upon which authorities exercise expert control, and deal with questions of uncertainty with the application of more science. The danger here being that the development of new approaches to the natural sciences, particularly those influenced by ideas around complexity, might fail to recognize the insight from mutual construction that the conventional paradigm is bound up with a commitment to prediction and control. The failure to deconstruct or unpack the suite of ideas informing policy around the natural sciences thus ‘risks redeterminizing science, though more comprehensively ... to the extent that the implicit commitment to prediction and control might be reinforced’ (ibid, p.209).

Shackley et al. examine a number of case-studies to make their argument for the mutual construction of social and scientific ‘realities’. Their important theoretical point is that:

knowledge cannot be entirely separated from institutional and other social relations. Hence, while such things as ‘public’ or ‘expert’ perceptions and their respective ‘interests’ and ‘responses’ can be stabilized as ‘objects of research’, their existence as such is conditional on the wider institutional and other relational dimensions in which they are embedded, including the researchers’ own subject-identities and programs. (ibid, pp. 214-215)

In creating such stabilized objects of research, researchers are prone to reification: to denote as ‘real’ objects that have been constructed through a process of inquiry. Reification acts to conceal the institutional and socio-historical contexts in which such objects have been constructed. Within what Ison and Russell (2000) call ‘first order R&D’, reification is associated with a failure to distinguish ‘between phenomena observable to the senses (such as sounds, sight and touch) and phenomena that are the products of the intellect (such as thoughts, beliefs and memories)’ (Ison, 2005, p.27).
Shackley et al. argue that recent interest in the science of complexity reflects a change in researchers’ framing of the world rather than any ‘real’ change in its nature. Within this framing they identify a ‘methodologizing tendency’, which describes a response to any new challenge or perspective in the form of methodological elaboration. Failing however, to acknowledge the context within which this ‘methodologizing’ takes place, ‘methodological elaboration can be seen as a form of institutional blinding to its own possibly problematic commitments, relations and identity’ (Shackley et al., 1996, p.217). The argument that the inclusion of soil health in the suite of ecosystem services may be a form of methodological elaboration is taken up in chapter six.

**Language and metaphor**

Writing from within a different tradition to the authors cited above, the American poet and farmer Wendell Berry (1977, 1981, 2000) provides an eloquent and passionate critique of industrial agriculture. In common with Thompson and others, Berry seeks to situate agricultural practices within their cultural and social background, and in particular relates practice to images of humankind’s place in the world. Pre-industrial imagery, suggests Berry, was predominantly organic, ‘biological, pastoral’ or ‘familial’. ‘It may turn out’ he writes, ‘that the most powerful and most destructive change of modern times has been a change in language: the rise of the image, or metaphor, of the machine’ (Berry, 1981, p. 113). Within this mechanical metaphor it appears perfectly reasonable to refer to men and women as ‘units’ and to food as ‘fuel’. This ‘revolution of language’ that is the entrenchment of the mechanical metaphor, Berry argues, ‘is in effect the uprooting of the human mind’ (ibid, p.114).

What the machine metaphor reveals is a view of nature as a source of fuel and resources for mankind, and of farmers whose virtue lie in their economic efficiency of production rather than in caring for land or people. The machine metaphor further entails a particular view of the nature of ‘problems’ and their solutions. The natural world becomes inherently predictable and reducible to its readily identifiable and understandable parts (Abram, 1991), presenting the possibility of suitably trained ‘mechanics’ creating desirable change by manipulating discrete problematic parts.
Theories abound regarding the role of language and metaphor in scientific discourse. Within the objectivist tradition of discernible and absolute truths, science, in contrast to literature, uses language as ‘a transparent vehicle through which it transmits to others its encounter with a lawful universe’ (Bono, 1990, p.59). This view of language and science, which Bono traces to Plato, Aristotle and Bacon, serves to mask the reality of scientific discourse. Drawing on the work of a long line of theorists, Bono refutes the notion of language as a transparent and unproblematic medium, arguing that metaphor in particular plays a central role in unmasking important aspects of scientific discourse.

More contemporary theorists argue that metaphors are not ‘deviant’ (ibid, p.62), but are as Lakoff and Johnson (1980, p. 3) argue, ‘pervasive in everyday life, not just in language but in thought and action’. Richard Rorty (1980, p. 26) makes a similar claim, writing that ‘it is pictures rather than propositions, metaphors rather than statements, which determine most of our philosophical convictions’. Hesse (1993) extends the argument to the point of claiming that ‘all language is metaphorical’ in that it comprises a shifting network of similarities and differences.

Rorty (1989, p. 16) argues that the history of language and science can be seen as the history of metaphor: a history in which ‘Old metaphors are constantly dying off into literalness, and then serving as a platform and foil for new metaphors’. Rorty sees this process as ‘blind’ and contingent, ‘as much a result of thousands of small mutations finding niches ... as are the orchids and the anthropoids’ (ibid., p. 16). New metaphors succeed not because they afford a more accurate representation of the world but because they provide new tools with which new things can be done. In Philosophy and the mirror of nature Rorty (1980) traces much of traditional western philosophy to an image that arose with the Greeks, that of the mind as a mirror. It is this metaphor that makes sense of the idea of knowing the world through gaining more accurate representations of it, a conception of knowing that Rorty describes as ‘an automatic and empty compliment which we pay to those beliefs which are successful in helping

---

17 The idea of metaphor as deviant is generally attributed to Aristotle (Bono, 1990; McClintock, Ison, & Armson, 2004).
18 This quote appears in McClintock et al (2004, p. 26)
19 Shotter (1993, p.100) quotes this passage in discussing linguistic relativity.
us to do what we want to do.’ (ibid p.10) This idea of mirror imagery held sway for several centuries until Wittgenstein, Heidegger and Dewey challenged this invention of the mind and began to dismantle the claims of earlier philosophers to a foundational theory of knowledge.

Of particular interest for this thesis is the idea of ‘generative’ metaphors, a categorisation that recognizes a role for metaphor in influencing ‘how people think, reason and imagine in everyday life’ (Gibbs cited in Lopez, 2007, p. 10). Reflecting on the idea of the hermeneutic circle as a process, McClintock et al. (2004, quoting Coyne and Snodgrass) describe a role for metaphor in the iterative development of understanding such that ‘metaphors pre-structure our experiences and are in turn changed by those experiences’. What’s more this use of metaphor is to an extent unconscious; the process is ‘not something we can choose to use or not ... It is, rather, embedded in all thought and action’ (ibid, p.30).

Given that ‘metaphors both reveal and conceal’ (Ison, 2005, p.29), an examination of ‘metaphors-in-use’ can prove fertile ground for reflecting upon our own understandings and those of others. For Bono (1990, p. 61) metaphors, and language more generally, are ‘constitutive’ of science, ‘because they ground complex scientific texts and discourses in other social, political, religious, or “cultural” texts and discourses’20. A critical reading of metaphors may function then as a catalyst for the re-imagining of meaning in an established discourse. Bono (ibid, p.67), in this vein cites the argument of W. H. Leatherdale that ‘science needs the inoculation of ambiguity ... or the unexplored resources of a metaphor if it is to marshal its resources for survival and growth’. Yet as McClintock et al. (2004, p.44) suggest, metaphors can also ‘disable’, acting to ‘limit our choices and constrain openness to our experiences’.

Thought and language

A rich tradition of scholarship in psychology, philosophy and linguistics reveals the inadequacy of objectivist notions of language as a ‘transparent vehicle’, presenting instead a range of arguments that explore the interconnections between thought and

---

20 This is a similar argument to the one outlined above in Shackley et al. (1996).
language. Kuhn (1979, p. 418) for example, describes the less than transparent process of ‘accommodation’ between language and the world:

Was the earth really a planet in the world of pre-Copernican astronomers who spoke a language in which the features salient to the referent of the term “planet” excluded its attachment to the earth? Does it obviously make better sense to speak of accommodating language to the world than of accommodating the world to language? Or is the way of talking which creates that distinction itself illusory? Is what we refer to as the “world” perhaps a product of a mutual accommodation between experience and language?

For John Shotter (1993, pp. 100-101), rather than acting as a ‘mirror’ to a language-independent reality, speaking and writing serve as practical tools to ‘formulate the topics of our discourse and to give them a structure appropriate to our forms of life, which otherwise they would in themselves lack’. The structure ‘given’ to the world through our language however is also determined to a considerable extent by the nature or ‘grammar’ of our language. From a developmental perspective while thought and speech may have different roots, once merged in ontogenesis they ‘develop together under reciprocal influence’ (Kozulin cited in Vygotsky, 1986, p. xxxi).

The reciprocal nature of thought and language raises the possibility that speaking or living ‘within’ another language might provide an alternative way of being or of experiencing the world. Shotter explores this idea through Whorf’s (1972) work on the language of Native American Hopi. In asking whether we all experience the world in the same way or whether our experience is influenced by the structure of language, Whorf was particularly interested in concepts of time and space in Hopi and in European languages. Time in Standard Average European (SAE) languages is ‘objectified as counted quantities’ measured off in lengths and units in the same way we would count apples or chairs. While Hopi appears more concerned with the

---

21 Wittgenstein uses the word grammar in the sense perhaps of the function or role a word plays in an utterance; hence his claim that ‘Grammar tells us what kind of object anything is ...’ (Shotter, 1993, p.98).
22 The origin and development of the individual living being (OED).
23 At a seminar I attended in 2008 Ray Ison spoke of the way he felt he was a different person when speaking in a language other than English. His comment reminded me of a similar comment made to me by an ex-girlfriend who was born to French parents but grew up largely in English speaking countries.
experience of things ‘becoming later’, such that what we would call a ‘length of time’ is not a ‘length but ... a relation between two events in lateness’ (ibid, p. 129).

Whorf also explores the way language influences behaviour through an analysis of insurance reports of fires and explosions. While his investigations initially focused solely on the physical conditions which led to the fires, he began to see that human behaviour was also an important factor. Behaviour in turn was related to the meaning people gave particular situations, where meaning resides ‘in the name of or the linguistic description commonly applied to the situation’ (ibid, p. 124). Thus behaviour around ‘empty gasoline drums’ is conditioned by a sense of the word ‘empty’ that suggests a lack of hazard, when in fact empty drums are more dangerous than full drums, as the former are ‘full’ of explosive fuel vapour.

As for metaphor in particular, language more generally can provide an insight into otherwise hidden or taken-for-granted aspects of our ‘thinking’. A significant aspect of becoming socialized into an academic discipline involves learning the appropriate language or dialect within which the discipline is conducted. In order to earn one’s academic stripes it’s necessary to learn ‘how to discipline or thematize our talk in terms of a certain limited set of images’ (Shotter, 1993, p.89). While these limited set of images might provide a ‘comfortable’ and familiar framework for a discipline, an acceptable shared language, Wittgenstein alerts us to the trap: ‘A picture held us captive. And we could not get outside it, for it lay in our language and language seemed to repeat it to us inexorably’ (emphasis in original) (ibid, pp. 89-90). The argument that ‘What our ways of talking represent as being “in” the world are “in” our way of representing it’ (ibid, p.116), that is ‘in’ our ways of talking about it, has implications for processes of communication and understanding: two important themes in this study.

**Power and language**

In his introduction to Bourdieu’s *Language and symbolic power* (Bourdieu & Thompson, 1991), Thompson suggests that in understanding the function of language in power

---

24 See also Knorr Cetina (1999).
relations, it is important to recognize that the power behind language arises from certain social relations, such that ‘the spokesperson avails himself or herself of a form of power or authority which is part of a social institution, and which does not stem from the words alone’ (ibid., p. 9). Institutions achieve their stability in part through the establishment of discourses that require all who wish to take part to observe the rules and formalities that apply. Beyond the mere formalities of discourse however, the wielding of symbolic power makes use of the ‘active complicity’ of those who benefit the least. Subjection then operates through the recognition or tacit acknowledgement of ‘the legitimacy of power, or of the hierarchical relations of power in which they are embedded, and hence they fail to see that the hierarchy is, after all, an arbitrary social construction which serves the interests of some groups more than others’ (ibid, p.23). And it is the recognition of the ‘construction’ of discourse and hierarchy that offers the vision of alternative sets of relations.

As humans we are embedded in language and to generate meaning outside of language seems virtually impossible. The point has been made above in regard to metaphor and can be made again in relation to language in general, that our use of words and imagery can to an extent be unconscious. Dominant discourses retain their position through their continual and to a degree unconscious reproduction. In attempting to break out of an established discourse then, the question arises as to what language is suitable for this purpose. Humberto Maturana recounts an exchange from his student years when Professor Young said to him; ‘When you want to say something new, you have to invent a new language. Because if not, you will be trapped by the language you’re using and people will hear what the language says, not what you say’ (Russell & Ison, 2004, p.46). Maturana soon realized that there was far more involved in communicating his ideas than simply devising an appropriate language. He goes on to say that ‘as soon as I tried to say something in a different form nobody understood. So the only possibility was to interact’ (emphasis added) (ibid., p. 46). This idea of communication and meaning making as interaction is one of the subjects taken up in the following chapter.
Chapter 2: A model of research

In the previous chapter I argued that in a work of inquiry it is important to establish a philosophical foundation from which the work emerges. I sought also to sketch out some of the philosophical and theoretical foundations on which the dominant practices in agricultural R&D and environmental management have been based. Working from a particular model of research I will outline alternative conceptions of knowing and understanding ourselves and the world, which lead to different approaches. Given that so much of the impetus for my research stemmed from a critique of agricultural extension, it is necessary that I introduce an alternative philosophical framework within a model of research that takes account of the relationship between the researcher and the world he or she is researching. My argument, like that made by Ison and Russell and others, is that much agricultural research is founded on an overly simplistic model in which the researcher is a neutral observer and discoverer of truth. Counter to this view I argue that agricultural research and discourse is shaped by a set of values and assumptions that significantly influences its products. A critical engagement with agricultural science and policy then, a central aim of this thesis, requires the examination of the nature of its practice. And in proposing an alternative approach to dealing with agricultural issues I need to outline aspects of a practice that acknowledges the researcher as acting within certain traditions, and as actively reproducing particular values and beliefs.

A model of research

Peter Checkland’s (1985; see also Ison, 2008a) FMA model is a useful tool to help think and write about my practice as a researcher. The model helps me to highlight the interdependencies between my worldviews and assumptions (F, framework of ideas), my understanding of the ‘situation’ being researched (A), and the choice of an appropriate methodology (M) with which to examine or explore the situation further. In discussing methodology I refer to what Oliga (1988, p. 90) describes as the ‘method of methods’. As Checkland puts it, the methodology is a way of applying the linked ideas that make up the researcher’s intellectual framework.
Another noteworthy aspect of Checkland’s model is that it provides an ‘expanded’ notion of the practice of research by encouraging us to ‘reflect upon what learning has been acquired, learning about all three elements: F, M and A’ (emphasis added) (Checkland, 1985, p. 758). This reflective and critical approach to research practice stands in contrast to traditions of positivist research and ‘hard’ systems thinking where consideration of methodology (as a ‘metamethod’) is dismissed as being ‘unscientific’ (Oliga, 1988), and where ‘solutions’ are sought to ‘problems’ through ‘the evaluation of the efficiency of alternative means for a designated set of objectives’ (Ackoff cited in Checkland, 1985, p. 759). The emphasis in what Ison and Russell (2000) describe as ‘first-order’ research often lies with the results, on what was ‘discovered’, at the expense of considering what was done and why, and of unmasking the assumptions and commitments that inform that action. Donald Schön (1995a, p. 30) argues that aspects of methodology may be reproduced uncritically because there

Figure 3.1: A heuristic model of research (Source: Ison, 2008a, following Checkland, 1985).
is insufficient recognition of research as involving ‘knowing-in-action’, a form of ‘tacit knowing’ that is frequently difficult to describe.

Within the traditions of systems thinking associated with Checkland and others, there is explicit recognition of the normative commitments made by a researcher, for example in choosing the nature of the relationship between researcher and researched. Of particular note for this chapter is a consideration of methodology as an examination of the ‘aptness of all research tools’ (Oliga, 1988, p. 90), especially in relation to the researcher’s framework of ideas and the ‘area’ in which these tools will be applied. Oliga is one of a host of authors including Bawden (1991), Kemmis (2001, 2008) and Schön (1995a, 1995b) to name a few, who urge us to take a closer look at what it is that we do when we do research.

**Area of application**

Part of the beauty of Checkland’s model is that it has no obvious beginning or end, but for the purposes of getting on with this discussion I will start by looking at my understanding of A, the area of application. Presciently, Checkland (1985, p. 758) draws A ‘without sharp boundaries to remind us that when A is human affairs, the application of F, through M, may lead us into byways not initially expected’. This last phrase, as I hope to make clear, would make a suitable subtitle for the story of my research. I should also make note of Checkland’s (1984) instruction that models such as the one I am referring to here are designed for the purposes of discussion and not as depictions of what is.

Ison (2008a, p. 4) expresses a preference for referring to A as the ‘situation’ or ‘real world situation’. He argues that talking about the situation better reveals the researcher’s role in creating or reproducing particular ideas about the nature of the situation in question because the ‘nature of situations cannot be divorced from our own epistemological, theoretical and methodological commitments’ (ibid., p. 5). As an example Ison argues that the widely used language of ‘problems’ as a description of the nature of situations not only ignores its particular social construction, but that the

---

25 It is important to note that there exists a variety of traditions within the broader idea of systems thinking. This chapter makes more apparent the particular traditions that I have chosen to reproduce.
‘problem metaphor’ also acts to conceal the idea of opportunities. Thus describing a situation as a ‘problem’ steers the researcher towards a set of understandings and ways of working, a tradition, within which the language and logic of ‘problems’ and ‘solutions’ has developed. Woodhill and Röling (1998), as we saw in chapter one, trace the logic of reductionism and the application of discrete solutions to problems to the enduring influence of instrumental reasoning.

In the early stages of this project my understanding of the nature of the situation was influenced by the idea of social-ecological systems and their emergent properties, which includes an inherent unpredictability. Over the course of my research I have come to ‘see’ the nature of the situation, or perhaps I have come to be more interested in the idea of thinking about the nature of the situation as being essentially incomplete, contested and shaped by relationships and social processes of dialogue and learning. This understanding owes much to the epistemology and ‘practical hermeneutics’ of John Shotter, to which I will return later.

If there has been one consistent feature of my research project it is a sense of reaching out or grasping for something ill-defined and tantalisingly out of reach. While I feel confident that I have a greater understanding of what I am trying to do and how to do it, I am at the same time more and more comfortable with the idea that every act of inquiry is necessarily partial, speculative and unfinished. My choice of methodology has evolved throughout this project as my own understanding of ‘what it is that I am inquiring about’ has changed, and as my interests have moved further from the biophysical and increasingly towards the social: to questions of cognition, perception, learning and communication.

This project arose out of my interest in farming systems and the development of ways of growing food and fibre that sustained and nourished both human and ecological communities. My particular interest lay in soils as the foundation not only of productive farms but also of nutritious foodstuffs, healthy landscapes and prosperous rural towns. Modern soil and agricultural sciences however have been treating our soils like dirt; as largely inert growing media to be manipulated for chemical composition and physical characteristics best suited to maximising crop yields. At the
same time my personal experiences made it clear that farmers did not alter their practice on the basis of overwhelming technical or scientific evidence, and nor was the future of farming landscapes entirely in the hands of farming communities. I began to see farming less and less as a set of technical practices and more as a human activity that takes place within broader contexts that are economic, social, cultural and ecological.

**Complex ‘social-ecological’ systems**

My initial understandings of the subject of my inquiry were shaped in part by the work of Berkes, Colding and Folke (2003) and their descriptions of complex systems as possessing certain attributes not found in simple systems: attributes such as nonlinearity, uncertainty, emergence, scale and self-organization. In discussing such ‘systems’ as imagined by Berkes et al. it is worth remembering that these are models best employed as tools for discussion. In spite of the ease with which our language renders such systems as concrete objects, they remain products of the imagination. While these attributes apply equally to both ‘natural’ and ‘social’ systems, rarely do these systems operate independently of one another. Agriculture and farming have always been both natural and social; thinking of them as a ‘social-ecological’ system incorporates another level of complexity: that of the interactions between them.

Social-ecological systems challenge conventional models of environmental management in several regards. Linear models of ecosystem behaviour have been a feature of ecological science for decades, and have revolved around the idea of single equilibrium or a ‘balance of nature’ (Berkes et al., 2003, p.7). Complex systems, however, organize around a number of distinct equilibrial states or attractors. Systems subject to change, that is all systems, are capable of dramatic flips towards alternative equilibrium states when thresholds are reached. As thresholds are approached, systems tend to exhibit increasingly nonlinear behaviour and the timing and nature of the flip is rarely predictable. These features do not make prediction simply difficult, but rather lead to the conclusion that complex systems are ‘inherently unpredictable’ (Berkes et al., 2003, p.7; see also, Holling & Gunderson, 2002).
Another feature of complex systems as imagined by Berkes et al. is that they are hierarchically arranged: that is, they consist of many nested subsystems at a variety of different scales, like so many Russian dolls. This project for example, can be viewed as comprising one set of subsystems - being farm, district, catchment and region (this is by no means the only set). Each subsystem tends to have its own emergent properties and degrees of coupling with other subsystems, requiring careful consideration of scale when analysing or managing complex systems (Berkes et al., 2003). Waltner-Toews and Kay (2005) acknowledge the work of Koestler in using the language of holons and holarchies to describe these nested units.

Self-organization is a defining property of complex systems and is of particular importance during periods of instability. All systems are subject to change and death, decay and breakdown are part of this process. Operating through feedback mechanisms, the property of self-organization enables systems to reorganize at critical stages, and move towards one of a number of attractors or equilibrium states. Self-organization ensures that a breakdown or crisis is not followed by chaos and random events (Berkes et al., 2003). Self-organization is an important concept in the work of Shaw (2002) and Griffin (2002) in applying a conversational model to organizational and cultural change. Their work will be picked up again later in this chapter.

On reflection the idea of social-ecological systems as described by Berkes and others appears somewhat mechanical and deterministic, although a closer rereading might provide me with a different impression. While their work provided some useful concepts with which to imagine the subject of my inquiry, I failed to gain a useful understanding of how people learn, communicate and work together, and thus to find some way of engaging with them. People, as imagined in social-ecological systems, are curiously impersonal. This question of engagement, of the nature of my relationship with my co-researchers, is central to my thesis and represents a significant shift in the thinking and doing of my research. This shift in approach has been shaped both by ethical and biological considerations, and through both action and theory. Bawden (1991, pp. 11-12) describes his own ‘experiential approach’ to learning in a similar fashion, ‘as a synthesis of the concrete and the abstract; of fact with theories, of matter with mind, of the objective with the subjective’, all conceived as ‘different
aspects of the same process linked by the tension of difference’. The attempt to reconnect what Descartes and others set up in opposition, be it theory and practice or truth and falsehood, is an important aspect of many systems traditions.

**Human systems are different**

As a neophyte social researcher I was initially attracted to an established framework with which to start my investigations, a relatively straightforward means of data collection that would propel my research towards us all ‘taking action’. I felt that in focusing on soil health I had identified a genuinely worthwhile topic and the interest I was developing among the small group of farmers I had spoken to seemed to confirm this. The troubling question however was whether it was ethically reasonable for me to decide upon a course of inquiry, if I was seeking to work *with* and not *on*, a group of people.

Paulo Freire (1972, 1973) reveals unequivocally the ethical and political dimensions involved in working *with* people; in his case in ‘teaching’ or more accurately in ‘conscientization’ of Brazilian peasants through the development of literacy. Freire realized that the form of education, in particular the relationship between (and the identity of) ‘teacher’ and ‘student’ was at least as, if not more important than the content. Education, for Friere (cited in Diduck, 1999, p. 89), is a form of ‘social interaction that can either empower or domesticate the learner’.

Freire’s notion of banking education, where the teacher deposits a body of knowledge into the relatively empty ‘mind’ of the student, is remarkably similar to the Transfer of Technology (ToT) approach to agricultural extension. Both share a concept of knowledge as both inherently ‘truthful’ and as something that an individual can ‘possess’ as his or her own. Learning and communication are thus regarded as the unproblematic transfer of a package of knowledge from one party to the next in a process that glosses over the intricacies of ‘knowing’. McClintock et al. (2004) point out that the metaphor of ‘knowledge transfer’ entails the idea that research need not be conducted within the context in which it is applied.

---

26 Shotter (1993) identifies both of these aspects as belonging to the Cartesian style of thought and inquiry.
A critical consideration of ToT as the dominant approach in agricultural extension and R&D was central to the development of this project. Over the last thirty or more years a vigorous debate among extension practitioners and theorists has led to the creation of host of approaches better suited to what are increasingly understood as complex and contested situations. Bloome and Coutts (cited in Hamilton, 1995) describe the evolution of four broad approaches to extension, from ToT through ‘Problem Solving’, ‘Education’ and ‘Human Development’; each approach is marked by the requirement for greater people skills, the recognition of greater complexity of the situation, and a change in style of engagement from persuasion to facilitation.

What is of particular interest as far as the current discussion is concerned is the idea that approaches to extension or R&D as methodologies can be chosen according to the researcher’s understanding of the situation being studied. As Bloome and Coutts (ibid) suggest, while there are obvious differences between these approaches they are not necessarily in direct conflict, but may be complementary. In situations where the ‘problem’ is widely understood and agreed upon and can be clearly stated, and where there is broad agreement on values and appropriate means, ToT approaches can be effective. A critical look at ToT as a practice however reveals what sorts of learning and communication are going on between and within researchers and ‘participants’ when they are engaged in agricultural extension. It is also clear that aspects of ToT approaches remain very influential as evidenced by a rich vein of literature and policy concerned with low rates of technology adoption.

**First and second order traditions**

Ison and Russell (2000) contrast first and second order traditions within R&D. In first order approaches the researcher remains ‘outside the system being studied’ and operates from a perspective of objectivity. The researcher’s thoughts and actions are shaped by a belief in a ‘real world’: that is in ‘a world of discrete entities that have meaning in and of themselves’ (ibid, p. 10). Disciplinary-based and de-contextualized research identifies both the problem and its solution, which is then transferred to passive recipients. For Ison and Russell the first order tradition, encapsulated by the ToT model of rural extension, is both largely ineffective and theoretically unsound. At
the heart of this model lies a belief in communication as being akin to the transfer of
coded messages in much the same way several computers might exchange data. The
work of Humberto Maturana and Francisco Varela (1987) on the biology of
cognition suggests that human communication proceeds in a far different manner.
Ison and Russell (2000, pp. 20-21) are among a number of researchers whose work
with ‘human systems’ has been heavily influenced by Maturana in particular; humans,
they argue are ‘informationally closed’ or ‘structure-specified systems’ who
cannot be instructed with knowledge by another living system. It is one’s
history of interactions and the closed self-generating structure (autopoiesis) of
the human that determines what will happen and not the nature of the
information. Often the observer acts as if there was a case of instruction by
knowledge but this cannot be the case biologically (emphasis in original).

Humans are biologically closed systems; there are no inputs to the nervous system
analogous to a computer connection and thus no ‘instructive interactions’ between
systems. Interactions between humans can trigger a response but the nature of that
response can be determined only by the individual who is responding.

This is not to marginalize processes of interaction, far from it, for the concept of
‘structural coupling’ – defined as ‘a history of recurrent interactions leading to
structural congruence between two (or more) systems’ (Maturana & Varela cited in
Woodhill & Röling, 1998, p. 62), is crucial to Maturana and Varela’s explanation of
human communication and learning. The notion of structural coupling is also
congruent with the epistemological basis of this thesis, that a multiverse of realities are
constructed through conversation, and it is through conversation that we can explore
and even reconstruct these realities: particularly our own. Interaction and
conversation are also central to what Ison and Russell (2000) call second-order R&D,
and to the praxis of Shotter (1993), Shaw (2002), Griffin (2002) and others.

27 I can only agree with Russell and Ison (2004) that the writing of Maturana can be very challenging. Both
authors draw considerable inspiration from Maturana and explain that engaging with him personally
through workshops and conversations has been far more satisfying than reading his work. I certainly
struggled with The tree of knowledge and find secondary interpretations of his work often to be more
readable.
28 This description belongs to Woodhill and Röling (1998, p. 62) who write that changes in an
‘informationally closed system ... can only be triggered. External stimuli cannot direct change’ (emphasis in
original). Other researchers influenced by Maturana include Bawden, Macadam, Packham and Valentine
Emotioning and affect

For Maturana the most important aspect of interaction and conversation is emotion, or rather emotioning. The verb helps us to avoid the trap of focusing on emotional states rather than the dynamic flow of emotions in which we take part. Given the overwhelming emphasis in agricultural R&D and in environmental management (EM) on ‘knowledge’ and rational behaviour, highlighting the role of emotioning in human interaction and learning is a radical step. The argument that a change in human behaviour or action is the result of a change in emotioning, rather than a rational decision based on the weight of information, provides not only a useful explanation for change but opens up new ‘spaces’ for engagement and reflection.

Russell and Ison (2004) draw on Maturana to help them re-imagine their practice as being engaged in a network of relationships, each of which is shaped by emotions. This leads them ‘to the conclusion that our main responsibility as researchers/consultants was to attend to the particular emotion in any conversation, given that the desired and useful outcome ... was dependent on the specific emotion shaping the conversation at any one time’ (ibid, p. 38). An awareness of the emotion being enacted and the capacity to modify that emotion, and thus the quality of the conversation and the relationship, provides a creative opportunity for the researcher to act as choreographer: as the designer of the ‘dance of emotions’ (ibid, p. 39, see also Russell & Ison, 2005).

Paying attention to the flow of emotion is intuitively appealing to me as a researcher, and Maturana’s explanation of human communication and understanding fits with my own experiences in agricultural extension. Foregrounding emotion however tends to be treated with suspicion at best, if not open hostility, whenever the discussion involves subjects that fall under the purview of science (Fell, 2000). Dispassionate rationality remains the preferred approach to questions of ‘scientific’ policy despite

---

29 It seemed clear to me when talking to farmers about adopting ‘biological farming’ practices that decisions were not made entirely ‘rationally’ or on the weight of evidence. A common anecdote concerned the farmer whose response to successful farm trials would be that it ‘wouldn’t work on my place’. Is this simple scepticism, or perhaps an intuitive sense that context is all important? It seemed obvious to me that decisions were shaped at a deeper psychological level that was fairly impervious to any amount of data or attempts at persuasion. A degree of fear of the unknown (better the devil you know), of failure or of being isolated by your community also cautions against making significant changes to farming practice for many.
the fact that we are intrinsically emotional beings\textsuperscript{30}, and that ‘scientific’ disputes are informed by argumentation and persuasion, and not simply by ‘logos’ (Gottweis, 2007). Within the social sciences there has been considerable interest in the role and nature of emotions, particularly in the last decade or so. In Affect and emotion Kate Wetherell (2012) provides a critical review of some of the major lines of research into emotion while outlining her own model of ‘affective practice’. Affect, while largely concerned with emotion also incorporates phenomena such as bodily actions, performance, habits and the formation and dissolution of social groups to name just a few. Affect and emotion are regarded here as essentially relational and social activities and not as expressions of internal states. As Burkitt (1997, p. 45) puts it, ‘The function of emotion is one of communication, as signs in the networks of social relations and interdependencies’ (emphasis in original).

Simply put Wetherell’s model of affective practice is concerned with meaning making as a complex social activity. The model draws attention to the ways in which emotions and feeling states are embodied, patterned and ordered, culturally constructed and continually shaped through interaction. As Wetherell is at pains to point out, engaging with affect is not an alternative to engaging with discourse, for the affective and discursive are intricately entwined. Affect appears somewhat hard to pin down. It is both an everyday practice about which we all possess ‘a wide-ranging, inarticulate, utilitarian knowledge’ (Wetherell, 2012, p. 78), while as an object of academic interest it presents the practical and theoretical challenge, especially for discipline-based enquiry, of engaging with phenomena ‘that can be read simultaneously as somatic, neural, subjective, historical, social and personal’ (ibid., p. 11).

\textbf{Appreciative systems}

Before looking in more detail at the social construction of reality and the role of conversation I want to introduce another influential voice on the nature of human systems. After a variety of careers broadly involving ‘management’, Sir Geoffrey

\textsuperscript{30} The neurologist Antonio Damasio (1996) has written a number of books on the neurophysiology of emotion, including the wonderfully titled \textit{Descartes’ error: emotion, reason and the human brain}. 

35
Vickers spent the last part of his life writing on a broad range of subjects he gathered together under the rubric of ‘governance’. Firmly believing that human systems are fundamentally different from the ‘systems’ studied by the natural sciences, Vickers writes consistently of the need for a more humanistic approach to systems and management thinking. Convinced that the widely held idea of ‘goal-seeking’ represents an impoverished sense of human behaviour, Vickers instead argues that people are more concerned with the maintenance of relationships. He writes that,

The meaning of stability is likely to remain obscured in Western cultures until they rediscover the fact that life consists in experiencing relations, rather than in seeking goals or ‘ends’. The intrinsic confusion about means and ends arises from the fact that no end can ever be more than a means, if an end is equated with a goal. To get the job or marry the girl is indifferently an end, a means and a goal; it is an opportunity for a new relationship. But the object of the exercise is to do the job and live with the girl; to sustain through time a relationship which needs no further justification but is, or is expected to be satisfying in itself (emphasis added) (cited in Checkland, 1985, p. 762).

What sets human systems apart ‘is their capacity to generate and change the settings of their own systems’ (G. Vickers, 1984, p. 45), and these settings reflect the norms and values held by an observer or observers. Any notion of a purely objective inquiry is rendered impossible by the fact that an observer ‘looks out from an inner world and through an inner world which structures and gives meaning to what he sees’ (ibid, p. 142). Importantly this inner world is constantly shaping and being shaped by the observer’s experiences and relationships. Vickers describes this world, these ‘settings’, as ‘a set of readinesses to see and value and respond to its situation in particular ways. I will call this an appreciative system’ (emphasis in original) (ibid, p. 143).

For Vickers then the most important aspects of ‘management’ or science are the normative rather than the technical; it is the readinesses that lie behind a process of inquiry that are of more interest than the ‘knowledge’ generated, for knowing cannot be separated from normative judgements. This concern leads to Vickers (ibid, pp. 33-

31 Vickers wrote an impressive numbers of books and papers following his ‘working life’, including Freedom in a Rocking Boat (1970) and the essays included in The Vickers Papers (1984). He was also an enthusiastic correspondent and his letters to and from the economist Adolf Lowe have been published as Rethinking the Future, edited by his daughter Jeanne Vickers (1991). Vickers remains influential with a number of systems researchers and was instrumental in Checkland’s development of Soft Systems Methodology. His influence can also be seen in the work of Ison (2005) and Bawden (1991; 1984).
34) cautioning that when scientists ‘become the servants of political or industrial masters, pursuing limited goals under conditions of secrecy, they become a public danger’. This it seems to me is an accurate description of much contemporary agricultural research.

The tendency towards ‘expert’ management, to the deployment of technical solutions to firmly set goals, as the quote above suggests, is clearly rejected by Vickers in favour of a conception of management Blunden (1985, p. 110) describes as the ‘capacity to discover, create, recognize and appreciate form, to distinguish order from disorder’ and as ‘an interactive process of norm-setting and action-taking’. Central to this task is the exercise of judgement\(^{32}\) rather than the application of knowledge or intelligence, for there is no other suitable guide in choosing how to inquire into, or to go about intervening in the lives of others. Expert management with its focus on problem solving and what Ackoff (cited in Checkland, 1985, p. 759) describes as ‘the evaluation of the efficiency of alternative means for a designated set of objectives’, thus serves to downgrade the tacit and discretionary aspects involved in judgement.

Schön (1995a) echoes Vickers’ concern and makes a case for greater recognition of tacit knowledge; tracing the dominant form of professional knowledge he describes as ‘technical rationality’, to the Veblenian bargain that enacted a clear distinction between research and practice. The result being that in the ‘turbulent’ and ‘uncontrolled’ world of practice, research produced in centres of higher learning is often of little value to practitioners. Schön (ibid, p. 29) argues that in the ‘intuitive performance’ of our tasks we,

show ourselves to be knowledgeable in a special way. Often we cannot say what we know. When we try to describe it, we find ourselves at a loss, or we produce descriptions that are obviously inappropriate. Our knowing is ordinarily tacit, implicit in our patterns of action and in our feel for the stuff with which we are dealing. It seems right to say that our knowledge is in our action. And similarly, the workaday life of the professional practitioner reveals, in its recognitions, judgements, and skills, a pattern of tacit knowing-in-action.

Both Schön and Vickers draw our attention to a host of skilful actions that reveal ‘knowing more than we can say’ (Schön, 1995b, p. 51). Amongst these we can include the notion of affective performance outlined by Wetherell above. It seems to me that if as Schön suggests we struggle to explain or describe these skills of judgement and artfulness, it is little wonder they may be treated with suspicion or a lack of regard when stacked up against the skills involved in rational problem solving.

Throughout, Vickers retains a concern with the quality of human lives and a view of human activity as arising from relationships, and from the capacity of people to define and refine the norms and standards by which they live and work. This hopeful and ethical concern with humanity is well illustrated in a speech he made to the National Association of Colliery Managers, in which he urged the audience to think of coal pits both,

as workplaces and as communities of people. I believe that the second is more important and that the chief significance of the first is as an expression of the second ... A hole in the ground, as such, will attract no one but a geologist or a cave explorer; but a pit is more than a hole in the ground. It is a community of men, engaged in a common enterprise; difficult, challenging, complex, interesting and important. (cited in Blunden, 1985, p. 108)

**Systems traditions**

With some difficulty I have come to an understanding of systems and systemicity as less a characteristic of ‘real entities’ and more as a way of thinking about the process of research. This shift in my understanding follows the work of von Foerster and others in the development of second-order cybernetics. The term cybernetics is derived from the Greek meaning ‘helmsman’; and first-order cybernetics is concerned with circularity through the operation of feedback, using the image of a thermostat-controlled heater as a classic example (Ison, 2008b). Within the first-order cybernetic tradition communication is unproblematic and conceived of as the ‘transmission of unambiguous signals which are codes for information’ (Fell & Russell, 2000, p. 34). Research employing mechanistic metaphors of ecosystems remains strongly influenced by first-order cybernetics (E. F. Keller, 2005).
The cybernetic concern with circularity led to the question of control being asked of the controller. Second-order cybernetics is thus concerned with the ‘observer rather than what is being observed’. Fell and Russell (ibid, p. 34) go on to claim that,

This is a philosophical jump of such proportions than many writers on human communication still choose not to acknowledge it too openly. We do so because we think it provides a bridge from the rather infertile land of communication theory based solely on the idea of information transfer to another still largely uncharted territory where more basic biological mechanisms need to be considered. It requires a loosening of our grip on the supposedly certain knowledge that is acquired objectively, about a reality existing independently of us, and a willingness to consider the constructivist idea that we each construct our own version of reality in the course of living together.

The use of the word system is commonplace today and is used to describe a variety of situations in which there exists a set of interconnected elements, like a ‘health system’. The idea of a system also suggests a process of interconnection, in addition to the idea of a system as a noun (Ison, 2008b). However our predilection for categorisation and the fact that the word ‘system’ is a noun, suggesting something ‘real’ we can see and touch, leads us towards reification and the very real possibility of losing ‘sight of how these “things” came into existence and, further, the validity or viability ... of their ongoing use’ (Ison, 2008a, p. 7). Despite my immersion in some of the literature on constructionism, systems thinking and second-order cybernetics, I must confess that I have struggled to come to grips with the idea of a systems focus that is concerned with the observer and not on what is being observed. Part of my struggle I think stems from the deeply ingrained idea that systems are a real feature of the world, and this is perhaps because the importance of connectivity revealed by first-order cybernetic systems remains a crucial and valuable insight.

Crotty (1998) makes the point that, perhaps unsurprisingly, there is a degree of inconsistency in terminology about epistemology and other philosophical concepts. Crotty and Shotter (1993) refer to constructionism, while Fell and Russell (2000), drawing on Mahoney, and others such as Hamilton (1995, 1998) use the term constructivist. These authors are all referring to essentially the same epistemological theory. Crotty (1998, p.58) reserves constructivism ‘for epistemological considerations focusing exclusively on the meaning-making activity of the individual mind’, an idea that tends to suggest that all constructions of the mind are equally valid and deserving of respect. This approach, Crotty argues, works against a critical spirit, whereas constructionism, by contrast, emphasises the role of culture in shaping our view of the world, and encourages a critical engagement. For this thesis I will follow the terminology of Crotty except where quoting other authors.
Figure 3.2 reveals some of the richness and diversity that has developed within contemporary systems and cybernetics thinking. Following Checkland, the purpose of the figure is as a heuristic device rather than a map or inventory of systems approaches. The figure helps to discern those systems traditions that have informed my research and also serves as a reminder that when using the language of systems, the researcher should identify which systems lineages they are reproducing. In so doing it draws attention to the implications of the decisions I make to reproduce and conserve certain lineages and not others. A key concept in this regard is that of awareness: a requirement or responsibility as a researcher ‘to know the traditions out of which we think and act, including the extent of our epistemological awareness’ (Ison, 2008b, p. 148). Ison refers to this as the ‘as if’ attitude: awareness of our practice enables us to act as if the assumptions we make are ‘real’. The important
point here is to ask what we might then learn if, for example, we choose to understand the situation we are looking at as if it were a system to do X or Y.

Returning to the insights of second-order cybernetics, ‘Adopting an “as if” approach means that one is always aware of the observer who gives rise to the distinctions made and the responsibility we each have in this regard’ (ibid, p. 148).

**Rhetorical-responsive social constructionism**

In *Conversational realities* John Shotter (1993) addresses a number of the problematic themes already outlined in these opening chapters: namely language and objectivity. Shotter’s concerns with epistemology however extend beyond objectivity to a wider interest in revaluing or rediscovering traditions of argumentation and contestation, with a view to unlocking various ‘resources’ rendered invisible by strict adherence to the ‘all-encompassing’ spheres of objectivity and subjectivity. Our basic ways of thinking and talking, he argues, represented by these two ‘poles’, are so ingrained that we fail to appreciate their socio-historical roots. What’s more, in our uncritical acceptance of particular ways of thinking and talking we remain unaware of our role in their reproduction.

In highlighting the contested and constructed nature of ‘social orders’, Shotter draws attention to what the calls a ‘third sphere of diffuse, sensuous or feelingful activity’ that has remained in the shadows of the twin spheres of objectivity and subjectivity (ibid, p.7). And it is from within this ‘unordered hurly burly’34 of everyday life that there lies rich and untapped resources of creativity and ‘problem-solving’. In this view, ‘What was an eliminative or exclusionary struggle for the single, systematic, correct “view” (seeking a final solution), becomes a continuous, non-eliminative, inclusionary, multi-voiced conversation, forming... a “tradition of argumentation” ’ (ibid, p.9).

Social constructionists are interested in activity and flux, in the somewhat formless back and forth of human communication. To this concern Shotter brings a particular focus on the responsive nature of conversation and meaning making, to the way in

---

34 The term ‘hurly burly’ Shotter takes from Wittgenstein, along with several of the philosopher’s ideas concerning language.
which we relate to each other by responding to each other. Rather than considering the ‘referential-representational’ function of language as primary, this aspect ‘must be seen as secondary and derived, as emerging out of the everyday, conversational background to our lives’ (ibid, p. 8). To be heard, to have our descriptions of the world taken seriously, requires that we learn how to respond to others and to engage in rhetorical defence of our arguments and positions. Through this engagement, through this languaging as Maturana would call it, we are able to make connections, and it is the social and ethical processes associated with this connection-making that form much of the focus of Shotter’s work. Rather, he writes,

than with language considered in terms of previously existing patterns or systems formed from ‘already spoken words’, the version of social constructionism explored here focuses upon the formative uses to which ‘words in their speaking’ are put, and upon the nature of the relational ‘situations’ thus created between those in communicative contact with each other in their speaking. (ibid, p.6)

Conversation then is not simply of academic interest as the way in which we construct our worlds and relationships, but takes on a powerful ethical dimension that encompasses our need to be heard and to be engaged: as Bakhtin puts it, ‘the single adequate form for verbally expressing authentic human life is the open-ended dialogue’ (ibid, p. 62). Echoing Maturana’s concern with the coercive nature of objective knowledge, Shotter writes that the claim of ‘natural scientific’ general theories ‘to be able to speak in debates, correctly, on behalf of all those they study’ effectively denies them ‘citizenship in their society’ (ibid, p.15).

Lloyd Fell35, drawing on the work of Maturana and others, makes similar arguments for the primary function of conversation as being concerned with the maintenance of ongoing connections. Language he argues, is not denotative, it is not essentially a means of referring to ‘things’. Meanings are not transferred through conversation, rather ‘new meanings arise in the course of the conversation’ (Fell, 2000, p. 505). And underlying this flow of language is our flow of emotions, each constraining the other. For learning and understanding to occur then in a social setting requires ‘a genuine

35 See also (Fell & Russell, 2000)
connection, of heart as well as head’ (ibid., p. 505): a willingness to make personal and emotional connections with others and to accept the responsibilities that go with them.

**Agricultural and research ethics**

Leaving aside the impossibility of value free science I want to make a few comments about the place of ethical considerations in agricultural research. Several authors already cited argue strongly that the creation of truly ‘regenerative’ or ‘sustainable’ food production systems is as much or more a moral as it is a technical scientific cause. Thompson (1995) suggests that the applied nature of agricultural research together with its public utility mission means that ethics must be a central concern. He further argues that philosophers and ethicists have failed to engage with the need for an agricultural ethic ‘more sensitive to the spirit of the soil’ (ibid, p. 68) to replace the single mindedness of productionism. It should be remembered however that in pursuing the production of more food, researchers and farmers have long been engaged in work considered to be intrinsically worthy. So it’s not that there’s little room for ethical concerns within agricultural research but that these ethical concerns have been narrowly defined and defended, through a continuing adherence to productionism.

A number of researchers involved in trying to incorporate ethics into agricultural research agendas and institutions, have met with resistance. Dundon (1986, p. 40) for example suggests that researchers may in fact suffer an ‘excess’ of concern with ethics yet do ‘not feel trained to question ethical commitments and could scarcely re-examine them each day without a kind of paralysis of practical motivation’. The practical work of the agricultural scientist is rewarded by the narrowing of attention, by the thorough exploitation of a field of study that has already yielded success36. The paradigmatic production of disciplinary research through the literature and education, both through and within ‘an hierarchical set of institutions of impressive intricacy and

36 It is not only academia that rewards a narrowness of attention. The British film director Michael Winterbottom, renowned for his eclectic output, notes that commercial success in cinema is best achieved by ‘staying the same’. 
venerable antiquity’ (Dundon, 1982, p. 837), mitigates against a culture of critical reflection and responsibility.

Zimdahl (2000) regards the lack of institutional and disciplinary rewards for critical self-reflection as a contributing factor in the general lack of agricultural ethics education within US universities. Nor are undergraduates equipped with these tools, having learnt ‘as an unexamined matter of faith’ that being engaged in the inherently good and worthy mission of feeding the world renders ethical reflection unnecessary. Griffin (2002) argues that this sort of disengagement with individual ethics and responsibility is widespread within many, especially large, corporations and organizations. In these cases ethical responsibility is located within the ‘system’ and in a few key individuals, leaving the rest ethically passive. This situation is made possible he suggests, by the reification of the ‘system’; by conveniently forgetting the ‘as if’ thinking that made the idea of the ‘system’ possible in the first place.

My own experience as a researcher appears to support Griffin’s argument. Having gained the ethical stamp of approval required for all postgraduate researchers, ethical consideration of my day to day work was a matter for my own conscience. Gaining ethics approval was a largely bureaucratic process, a necessary round of form filling with an emphasis on issues of consent and confidentiality. While these are entirely relevant and reasonable concerns this official process did not provide me with any tools for on-going ethical reflection on my work, and armed with official sanction I was free to pursue my research as I saw fit. There is no doubt an important place for ethics bodies in contemporary research organizations but they are no substitute for individual responsibility and critical reflection. By taking on the role they now play,

---

37 Zimdahl’s own experience as a researcher highlights the difficulties researchers may face in seeking to explore new intellectual ground and to question the assumptions that underpin the disciplines in which they work. Following 25 years of conventional weed research Zimdahl sought to develop an undergraduate course in agricultural ethics and wrote a number of journal articles on the subject. Using the number of citations these and earlier articles received as a rough indicator of research ‘success’ seems to support the idea that sticking with what works brings rewards. ISI Web of Science (accessed 26/3/13) records that the following papers on herbicide degradation (Vicari, Zimdahl, Cranmer, & Dinelli, 1996; Zimdahl, Cranmer, & Stroup, 1994) have been cited 25 and 28 times respectively, while Teaching agricultural ethics (Zimdahl, 2000) and Ethics in weed science (Zimdahl, 1998a) have been cited a total of 5 times. Even allowing for the difference in publication dates the figures suggest a considerable discrepancy in popularity or influence of the respective papers.
ethics bodies ironically appear to be enabling researchers to abrogate their own ethical responsibilities.

One of the key points I want to make here are that there are compelling reasons to regard difficult farming issues as involving shifting networks of meaning that are being continually reshaped through interaction. This is not to suggest that the technical aspects of farming issues are unimportant rather it is to draw attention to the all too often neglected meaning making and ethical dimensions of situations and to the transformative potential of conversations. In the course of this project I chose to focus on the generative and disruptive potential of conversation as a way of engaging with my co-researchers to both better understand their situation, and if possible, to take action to improve upon it. And while I may have been working within traditions that are certainly marginal in the agricultural sciences, the theoretical foundations of these traditions are well established.
Chapter 3: Methodological traditions

Several of the ideas discussed in the preceding chapters have already drawn attention to matters of methodology. These include consideration of the ethical implications of the relationship between the researcher and ‘participant’ (a relationship ‘chosen’ by the researcher), the valuing of responsibility over any notion of objectivity, and the inadequacy of technical-scientific approaches to situations in which there are no readily identifiable ‘problems’. What’s required then is a methodology, as a theory of methods, which responds to these concerns through a more critical examination of research practice.

A variety of methodologies have arisen over the last half century or more in response to the now well established critiques of positivist and reductionist science. Not surprisingly, given their ‘complex’ and applied nature, several of these methodologies have been developed in the fields of environmental and agricultural management. It should be pointed out that these critical responses have not arisen as mere counterpoints to established approaches but as alternative visions for the conduct of scientific inquiry with their own philosophical foundations. The methodology and choice of methods for this project has been influenced by several of these approaches, a number of which have already been briefly discussed in the preceding chapters. An important aspect of these methodologies is that they are not prescriptive but rather acknowledge that individual researchers, influenced by particular frameworks and traditions, will develop their own interpretation or style of application of a methodology that best fits both researcher and situation. The purpose of this chapter then is to discuss what I have taken from these approaches and how they have shaped the methodological evolution of this project.

With hindsight a major developmental theme of my research has been not only the search for an appropriate methodology but its ongoing problematization. If as Woodhill and Röling (1998) and others argue that the ‘environmental crisis’ is more a social and political issue than a technical one, the practice of science and its relationship to society becomes a central concern. What began with a fairly simplistic notion of what constitutes a methodology, my engagement with a variety of critical
literature and my own experiences of engagement have led to a sharper focus on my practice as a researcher. While I enthusiastically nailed my colours to the masthead of Paulo Freire and saw myself as ‘empowering’ rather than ‘domesticating’, it was not until I sat down with my co-researchers (participants) in my role as primary researcher, that I was forced to confront the practicalities and ethical implications of my conduct.

**Figure 3.1: Diagram identifying some of the major influences on this project**

**Developing a methodology**

Figure 3.1 illustrates many of the most important aspects of my methodology together with the methodological traditions and authors who have shaped my work. Aside from providing the reader with a diagrammatic overview of the chapter there are several particular points I want to make about the figure.

The diagram itself (and the process of diagramming) is derived from some of the systemic research traditions identified in the figure. Systems teaching at the Open
University UK (Lane & Morris, 2001; Open University, 2006) places great importance on the skills of diagramming as a tool for thinking, for discussion and for communication. Diagramming as a tool is also apparent in the work of Checkland (1985), in publications of the SLIM project (2004) and in the work of Bawden (1991). The use of visual tools like diagramming is consistent with the idea of communication and learning as being more akin to a dance than a transfer of data, and recognizes the limitations of the written page.

The diagram acknowledges the key traditions, both intellectual and methodological, that I have reproduced in my work. Prominence is also given to a set of values associated with these traditions, values that have appeared both relevant and meaningful for me as a researcher for this project. The point of highlighting these values is not to suggest that more conventional natural scientific inquiry is objective and value-free and that the inclusion of values represents a radical departure from accepted methodology. Rather these acknowledgements should be regarded as part of the ethic of responsibility that Ison and Russell (2000) posit as being central to second order research. Any departure in methodology lies in the acknowledgement of values rather than in their legitimate role in a work of scientific inquiry. While I remain solely responsible for the practical decisions and intellectual commitments I made in the course of my research, these decisions were informed by the traditions outlined in the diagram: in that sense I did not act entirely alone.

The process by which I developed both my methodology and methods is also described in the diagram in the groundless and recursive relationship between theory and practice. My methodology and methods evolved step by step as I reflected on experience and the literature, seeking a way or working that was consistent with my understandings and beliefs. When I had settled on a way of interacting with my co-researchers I experienced this as being the right way to go about things, as almost the only way I could act that would make sense of how I felt at the time. Ison (2008a, p.

---

38 In developing figure 4.1 I made use of freely available on-line tutorials provided by the OU (Open University), go to http://systems.open.ac.uk/materials/T552/
39 The relationship between methodology and methods could itself be regarded as the interplay between theory and practice if methodology is considered as a ‘theory of methods’, method becomes the practice derived from the theory.
suggests something similar, that methodology arises through reflection on praxis and has to be ‘experienced [as] the degree of coherence, or congruence between espoused theory and practice’ (emphasis added). The direction of the arrows linking methodologies to values simply seeks to identify traditions in which such values have played a role. It is not to suggest that these values ‘flow from’ a particular methodological tradition or that there is an ordered progression from methodology to value, but rather as I point out above, methodologies and values are more likely to develop iteratively.

The value of the diagram lies not solely in its explanatory power; the act of drawing the diagram itself has helped me to clarify my thinking and to focus on those aspects of my methodology that seem most important. It also serves as a template for the remainder of the chapter.

**Action research**

Given my concerns with the shortcomings of technology transfer approaches to agricultural research when I started this project, action research (AR) appeared as an attractive alternative. AR offered the opportunity for engagement with people and their lived realities as a critical response to the detached and de-contextualized knowledge generation that characterizes much natural scientific research. AR today is a very broad church of schools and practitioners encompassing a diverse range of objectives and interests. The methodological traditions that appear in Figure 3.1 all trace their roots to varying degrees to AR, or more specifically to one part of the broader AR spectrum, and it is to these traditions that I will direct my discussion.

Grundy (1982, p. 23) describes the following essential features of action research: its subject is a ‘social practice’ that is susceptible to improvement; the project proceeds through a ‘spiral of cycles’ of planning, acting, observing and reflecting; and the project ‘involves’ those responsible for the practice as participants and researchers. The nature of this involvement gives rise to three modes of action research that Grundy describes as the ‘technical’, ‘practical’ and ‘emancipatory’, in accordance with Habermas’s theory of knowledge-constitutive interests (Kemmis, 2001). Technical
research takes place explicitly on the terms of the principal researcher, while at the other end of the spectrum, emancipatory research is truly collaborative and seeks to facilitate a critical examination of the social and organizational structures that underpin the participants’ situation. Not surprisingly, in practice AR projects often fail to fit neatly into any one these distinctions; however they serve as a useful guide to the researchers’ objectives and interests.

**Critical action research**

Participatory action research (PAR) emerged out of a critique of modernisation and the ineffectiveness of conventional scientific approaches in dealing with contemporary social problems, particularly those of the global ‘south’ (Fals Borda, 2001). Not only were conventional practices seen to be ineffective, they were also perceived as serving the interests of those in positions of authority (Lincoln, 2001). An important figure in the emergence of PAR was Freire (1972, 1973), whose work proved highly effective in not only developing literacy but in raising awareness among the poor of the role of power and knowledge, and in particular its expression *through* language, in keeping them poor and illiterate. I was initially hesitant to adopt the guise of an emancipatory action researcher; broadacre farming in the south of WA seemed a world away from the life of Brazilian peasantry living under a military dictatorship. That farmers the world over, rich and poor, profit the least from agriculture seems clear from Smith’s (1992) analysis of the declining wealth of American farmers. I would suggest that Freire’s concern with the application of power through language and the construction of knowledge remains relevant and legitimate within the setting for this project.

Greenwood and Levin (2007), whose approach sits towards the emancipatory end of the spectrum, draw on ‘general systems theory’ (GST) and the work of the American philosopher John Dewey to provide some of the central ideas for their praxis of AR. From the interconnectedness proposed by GST they reiterate Vickers’ argument that rational choice theories, despite their popularity within the social sciences, are an inadequate basis for understanding human activity. Scientific inquiry is undertaken in

---

40 Smith’s analysis is discussed in chapter 5.
a socially complex world where context and history and the organization of interconnected ‘systems’ are paramount. Dewey, whose academic career began in the 1880s, pursues several arguments that are often repeated by AR theorists and practitioners. Among these are the ideas that knowing is the product of ongoing cycles of reflection and action, and that action cannot be separated from thought. Dewey was also passionately committed to democracy, which he believed had to evolve through the peoples’ act of sense-making and experimentation, rather than through the imposition of solutions from outside. Dewey’s sense of democracy regards knowing as a social process open to all citizens, scientists and non-scientists alike. The crucial difference here lies with ‘the greater control by science of the statement of the problem’ (ibid. p. 64), rather than with the methods the two groups employ. The contemporary conduct of science and education however, particularly in the separation of thought from action and discipline from discipline, acts counter to this democratic ideal.

To act in accordance with the democratic ideal requires that the researcher values the narratives and perspectives of all interested parties. This diversity can also be considered as valuable in itself for what it offers the researcher. A diversity of perspectives and the inevitably conflicting and divergent ideas contained within them need not be regarded as complicating or obscuring clear conclusions but rather as an opportunity for creativity and depth, and the realization of multiple truths. The use of multiple voices is well established in a number of written traditions. William Faulkner (1931) for example makes use of it in the widely acclaimed *The sound and the fury*, so too does the Bible in the parallel accounts of the gospels. These ‘synoptic treatments’ Brown (2008, p. 22) suggests, enable ‘writers to generate unexpected insights on their core themes’. And as Greenwood and Levin (2007) argue, the individual case that undermines a general theory demands the same attention as a hundred conflicting cases. Robertson et al. (2000) make a case for the consideration of multiple perspectives in working to restore degraded landscapes. Local and indigenous knowledge contained in ‘“environmental narratives”’, they argue, should be ‘treated as a legitimate information source alongside scientific information’ (ibid., p. 119). Bateson (1979; see also Tognetti, 1999) places particular value on a multiplicity of
perspectives and the notion of two descriptions being better than one. At the risk of oversimplifying his approach, Bateson seeks out difference over conformity for the new information it provides. There are parallels here I think with Shotter’s (1993) interest in disorder, with dialectical inquiry and the value attached to narrative by many action researchers. An interest in difference and diversity requires the researcher to embrace uncertainty over unifying theory, and to be comfortable with paradox, disagreement and incompleteness in place of neat conclusions.

Kemmis\(^{41}\) (2001, 2008) draws heavily on the work of Habermas in developing what he calls critical participatory action research (CPAR). Habermas’ work on the interests that shape the generation of knowledge leads to the argument that truth arises through ‘truth-telling’, that is through an active social process of ‘communicative action’ that aims at ‘intersubjective agreement, mutual understanding and unforced consensus about what to do’ (Kemmis, 2008, p. 122). Kemmis and colleagues sought a form of critical inquiry that might help participants to reflect on the ways that assumptions, ideology and traditions shape social life. Many of the ‘problems’ facing critical action researchers, Kemmis argues, can be viewed through the lens of Habermas’ theory of system and lifeworld. Late modernity, the theory suggests, is characterized by a high degree of differentiation and autonomy of economic and politico-legal systems that are characterized by organizational and institutional structures oriented towards the attainment of goals through ‘rational-purpose action’ (emphasis in original) (Kemmis, 2001, p. 94). These systems have become uncoupled from the processes that sustain the lifeworld - such as socialization, individuation and cultural reproduction – such that ‘the systems appear to be “objects” (reified) to the people who inhabit them, as if (but only as if) they functioned according to their own rules and procedures’ (ibid., p. 97). As a result the circumstances and the nature of their creation as systems have become obscured, along with the possibility of their recreation. Habermas’ contention that systems have come to colonize lifeworlds suggests that the outcome of boundary crises will be largely determined by the logic of such systems. ‘The effect of the colonization of the lifeworld’, Kemmis writes, ‘is that

\(^{41}\) Kemmis acknowledges his work on AR as a group effort with his Deakin University colleagues, in particular Carr and McTaggart.
individuals and groups in late modernity increasingly identify themselves and their aspirations in systems terms’ (ibid., p. 97). One response to colonization Habermas suggests, lies in the creation of autonomous public spheres in which participants are capable of asserting themselves against the overwhelming influences of money and power; public spheres that are ‘neither bred nor kept’ by dominant political interests. It must be noted too that Habermas is not suggesting that system and lifeworld are separate realms rather they ‘need to be understood as dialectically-related aspects of social formation’ (ibid., p. 101). The use of Habermas’s theory to shed light on the conduct of natural resource management (NRM) will be discussed in chapter five.

CPAR seeks to enact a practice of critical self-reflection; it is as much (or more) a process of self-inquiry, cognisant of the social and intellectual settings in which individuals are constructed, as it is an inquiry into some aspect of the world ‘outside’. A key tool in this process, following Habermas, is that of public discourse and the creation of communicative spaces, wherein ‘emerging agreements and disagreements, understandings and decisions can be problematized and explored openly’ (Kemmis, 2008, p. 131). The most fertile ground for such spaces is often at the margins of institutions and other public spheres where control and legitimacy are a little frayed. Shotter (1993, p. 161) makes a similar point in calling for the recognition of the less-ordered realms of public life as providing vital resources for the ‘renewal of the vision of a genuine participatory democracy’. For the critical action researcher then, the conversations that take place within these communicative spaces are of particular interest and their facilitation becomes a central task.

The political critique enacted by many AR practitioners has ensured that it remains a marginal mode of inquiry within most contemporary research organizations. This is in spite of the fact that the intellectual foundations of AR have been in circulation since the early 20th century, and that 70 odd years of AR praxis has spawned a vast range of approaches to suit varied contexts and practitioners. Research funding and the policing of peer review Greenwood and Levin (2007, p. 74) argue, has ensured that the social sciences consist of ‘socially disengaged’ disciplines reluctant to engage in or promote social change. As a result, AR with its social and ethical commitments is labelled as being ‘unscientific’ and is denied support.
**Relationships**

The roles played and the relationships between *players* are of particular interest to many action researchers. Particularly for those involved in critical or emancipatory AR, a central aim is to re-imagine the more conventional relationship between the researcher and the researched as a more collective process in which all parties are participants. Recognizing the inequities perpetuated by expert researchers fulfilling the role of knowledge creators, AR seeks to involve all parties as researchers and to recognize the legitimate role of all actors to have a say in what counts as knowledge and knowing as it affects their lives.

For ‘community-based’ action researcher Ernie Stringer (1996) the creation and maintenance of positive relationships is a primary interest. Stringer draws on the work of Foucault and the values of democracy to champion the role of relationships in undermining dominant interests and realizing people’s abilities to contribute to society. The kinds of relationships required are those that promote equality and maintain harmony (while accepting disagreement), and that are cooperative and sensitive to others’ feelings. Such relationships also demand high standards of communication based on the qualities of attentiveness, truthfulness and acceptance. Stringer makes much use of his own background in education to illustrate these arguments while drawing on Habermas’ work on the ‘ideal speech situation’, which requires four conditions: namely that communication is understood, that it is truthful, sincere and appropriate. These ideas all seem perfectly reasonable and relatively straightforward when read and I’m sure that many of us would profess to both holding and enacting such ideals in our everyday lives. However they represent significant challenges both practically and professionally for the researcher. How and when for example, are such skills to be learnt and expressed when professional knowledge and learning remain within the domain of ‘technical rationality’? Schön

---

42 Kemmis (2001, p. 91) quotes Habermas’ dictum that ‘in a process of enlightenment there can be only participants’.
43 Healy (2011, p. 298) draws attention to the argument that while Habermasian ‘ideal speech’ provides for the conditions needed for inclusivity and egalitarianism, it also reinforces ‘presuppositions of homogeneity and uniformity’ that are incompatible with a genuine respect for difference. Elsewhere I have expressed support for Bateson’s argument that different perspectives provide more opportunities than they pose problems. In the following chapter I will briefly consider arguments regarding the value of consensus in environmental decision making.
(1995b) writes of a widespread ‘professional crisis’ which is the result in part at least, of the creation of new problems arising from the application of prior solutions derived from professional knowledge. While Schön is particularly interested in the difficulties of reflexivity, his comments regarding the suspicion with which professional knowledge regards that which cannot be rationalized, skills of intuition and artfulness for example, might also be applied to skills such as attentiveness, acceptance and the building of good relationships. It seems reasonable to suggest that this suspicion leads to a devaluing of such skills and competences within professional practice, leaving the would-be action researcher poorly prepared for a central aspect of his or her developing practice. The temptation for the practitioner to cling to their sense of expertise in the face of novel contexts and relationships must be strong. However as Schön (ibid. p.45) warns, when people (and relationships) are involved in the situation, preserving such a sense of expertise comes at the ‘clients’ expense’.

Among the more tacit and personal skills required by the action researcher, Greenwood and Levin identify the importance of playfulness and irony for their potential to disrupt business as usual. Irony and humour not only open up ‘patterns of thought to new possibilities’ but also act to lessen status inequalities and encourage participation (Greenwood & Levin, 2007, p. 127). Woodhill (1993) argues that the style and approach of the facilitator may be as important as the methodological framework employed. Being in a position of considerable influence and engaged in an inherently political activity, facilitators require a degree of sensitivity and an awareness of their ethical responsibilities.

**Knowledge creation**

The importance of context in action research, together with a commitment to certain democratic principles, shapes both the process and content of knowledge creation. That AR seeks to address real-life situations by engaging with those for whom the situation is problematic means that context is a primary concern. Democratic engagement demands that the views of all concerned actors (within the scope of the inquiry) are taken seriously and treated with respect. Knowledge created through AR is thus intended to serve the interests of the participants and to increase their ‘control
over their own situations’ (Greenwood & Levin, 2007, p. 64). The action researcher does not seek merely to validate ‘local knowledge’ or to match appropriate scientific knowledge to the context of the research situation. The task is rather to bridge the two through cogenerative learning ‘that creates both new local knowledge and new scientific understandings’ (ibid. p. 105). Remaining faithful to these principles requires that the action researcher remains responsive to the narratives that emerge in the course of research.

For Dick (1993), responsiveness is the most important reason why a researcher would choose to conduct AR. Where a situation might be regarded as ‘fuzzy’, where there is no clear and unambiguous problem statement, the researcher must be responsive to the emerging stories. Likewise a commitment to responsiveness demands that the inquiry begins with a somewhat open question that provides room for clearer questions to develop with time. As I argue in earlier chapters, it is impossible for a researcher to commence a process of inquiry free from assumptions about the nature of the situation and the knowing that underpins it. The action researcher however must remain alive to these assumptions and beliefs and retain a capacity for critical reflection upon them.

This lack of a clarity and apparent certainty can attract criticism from more conventional researchers. It is likely to mean that an AR project may be more time consuming and that the researcher must be comfortable with uncertainty and a certain lack of control over the direction of the project. There may be difficulties too in convincing others of the merits of your project when you are unable to frame your research in the form of a precise question. The proposal I presented for this research project focussed on questions around the meanings and understandings of soil health and proposed relatively conventional methods of inquiry. It lacked the critically reflective aspects that later emerged and that convinced me to relinquish control over the process of asking questions. I can’t help thinking that had my proposal for this research been closer in spirit to the path that it eventually took, it would have been received with some puzzlement.
Soft Systems Methodology

Returning to the FMA model of Checkland that I introduced in the previous chapter, methodology appears in relationship to the researcher’s framework of ideas (F) and the chosen area of application (A). And the nature of this relationship is one of appropriateness, to both F and A.

One of the central concepts of Soft Systems Methodology (SSM) is that the notion of ‘systemicity’ has been transferred from the ‘world’ to the process of inquiry itself. That is the inquiry becomes systemic, recognizing that the depiction of systems as descriptions of phenomena are constructed by researchers as reflections, at least in part, of the framework of ideas in which the researcher is immersed. As Shotter (1993) argues, this framework can be thought of as being both socially constructed and contested, in other words it is not ‘natural’.

SSM was developed by Checkland and his colleagues (1984, 1985, 1999; see also Checkland & Poulter, 2006) to tackle the ‘ill-structured problems of the real world’; situations described elsewhere as being ‘messes’ (Ackoff, 1974). These are the kinds of situations that do not respond well to positivist or technical-scientific approaches as, among other things, there is no clearly defined ‘problem’ to be solved. SSM was in many ways an attempt to operationalize Geoffrey Vickers’ work on appreciative systems and the management of human affairs. Checkland was concerned with what he saw as a number of complementarities that were unrecognized within ‘hard systems’ traditions. Chief among these is the complementarity within the FMA model: expressly the relationship between our pre-understandings and what we see in the world. As Checkland (1984, p. 94) argues, ‘R [reality] is the source of many x’s [intellectual constructions] which are themselves used in M [methodology] to enable us to perceive R [reality]’. This is a key concept within SSM and other systems methodologies that recognize any view of the world as essentially one among a host of possible views. This relationship between perceptions of reality and our intellectual

---

44 Checkland’s own concept of ‘social reality’ is very similar to that used by Shotter; he writes that ‘what in everyday language we call “social systems” are the ever-changing outcomes of a social process, language-mediated, in which human beings continually negotiate and re-negotiate with others their perceptions and interpretations of the world’ (Checkland, 1984, p. 102).
constructions is also central to the particular use of models within SSM as heuristic devices. Models, Checkland (ibid, p. 99) writes, ‘are not normative; they are not designs; their purpose is to orchestrate a debate about the problem situation’. It is through the creation of and reflection upon models that SSM functions as ‘an explorer of perceptions among concerned actors’ (ibid, p. 101).

A second complementarity and one that connects SSM to the varied traditions of action research, is that of theory and action. Given human capacity to act so as to confirm or refute any social theory, the intervention in human affairs, of which SSM is but one example, requires interaction between theory and practice ‘in a process of inquiry’ (Checkland, 1985, p. 757). As Vickers (1984, p. 45) argues, what sets human systems apart is their ability to ‘change the settings of their own systems’. Theory and action are interdependent: theory leads to action while reflection upon action generates theory. The lack of primacy within these complementarities points towards the condition of groundlessness as an ‘underlying organizing principle’ (Checkland, 1984, p. 102).

SSM seeks to move beyond the exploration of perceptions to the taking of action that is feasible, desirable and ethically defensible. Possible courses of action are arrived at through a cyclic learning process in which models are used to compare differing perceptions. SSM recognizes the existence of multiple realities within any human community and seeks an ‘accommodation’ among conflicting interests and perceptions rather than agreement or consensus. This is consistent with the idea of diverse views as an opportunity (Bateson, 1979; Greenwood & Levin, 2007), a rich source of energy, motivation and creativity, rather than a problem to be eliminated (Checkland & Poulter, 2006). Within the environmental management literature however there appears to be considerable support for the idea that consensus is a desirable if not necessary condition for effective action (see for example Cooke, Langford, Gordon, & Bekessy, 2012; Lohr, Cox, & Lepczyk, 2012; Regan, Colyvan, & Markovich-Nicholls, 2006). For Russell and Ison (2005, p. 133) however, ‘a consensus position around agreed action is a lowest common denominator position in emotional terms’,
and in their experience ‘meaningful action was only ever taken by those committing
to the consensus if they held the consensus position in the first place’\textsuperscript{45}.

An important connection between SSM and traditions of critical AR is the emphasis
on learning as the means by which concerned actors, or stakeholders, engage with and
take action to improve a problematic situation. An emphasis on learning and a
commitment to a constructionist approach may help to avoid excessive concern with
finding the ‘right’ solution or asking the ‘right’ question, envisaging rather an on-going
process of questioning and exploration in which a multitude of perspectives and
possible courses of action remain open\textsuperscript{46}. Considering the question of where to begin
a process of inquiry, of how to be sure that you have truly chosen a ‘relevant system’
with which to start, Checkland (1984, p. 101) writes that it is more important to ‘make
some choice and learn your way to what is truly relevant in this particular human
situation’ (italics in original). I began this research believing that I had chosen a
relevant system, namely how this group of farmers understood soil health. I became
uncomfortable with the fact that this was explicitly my choice of and so chose my co-
researchers themselves to be the point from which we might learn what is ‘truly
relevant’\textsuperscript{47}.

Learning holds out the possibility of providing a ‘space’ for empowerment of
concerned actors. The potential of course is not always realized: learning, as Freire’s
argument suggests, can be configured as a form of domestication as much as
empowerment. Checkland argues (1984, p. 102) that in principle the process of
inquiry should be open to as wide a variety of actors and viewpoints as possible, but
that inclusiveness does not ‘lie within the methodology’; SSM can equally be used in a
reactionary or an emancipatory fashion.

The influence of SSM both on my work and on a number of contemporary
approaches to be discussed below will be clear. As to the actual methods employed in

\textsuperscript{45} Interestingly a variety of views around consensus and diversity emerged during my research. Rick
expressed the frustration he felt during his time on the local council, suggesting that had they been a body
of like-minds they would have been able to really achieve something. In another context however he spoke
of the benefits for our group of co-researchers of having a diversity of opinions.
\textsuperscript{46} I am reminded here of von Foerster’s maxim ‘to act so as to increase the number of possibilities’.
\textsuperscript{47} Within the context of feasible, desirable and ethically defensible improvements.
this study however, the practice of SSM as described by Checkland did not provide me with a set of tools or steps I could readily understand or feel I was able to put into practice. Without an experienced guide or mentor I felt I needed a simpler toolbox with which to approach my study.

**Learning methodologies in agricultural research; Hawkesbury**

Despite the narrow productivist focus of much agricultural research and the conservatism inherent in many research institutions, a number of learning-based and participatory approaches have been developed by extension practitioners. This is perhaps little surprise given the inadequacy of the transfer of technology (ToT) approach in dealing with the messy nature of many agricultural situations, the improvisational nature of farming as a craft and the physical separation of farm from university.

Several influential figures in the development of learning methodologies for agricultural research have been associated with the Hawkesbury campus of the University of Western Sydney, formerly the Hawkesbury College of Advanced Education. From 1978 to 1993 the Dean of Agriculture and Rural Development was Richard Bawden. Drawing on a number of the systems traditions and thinkers mentioned above, including Maturana, Checkland and Vickers, Bawden (1991, p. 26) describes a model, or models, of ‘critical, systemic, action-researching praxis’.

For Bawden learning is central to our relationship with the world and with each other. Learning is also a highly individual process: shaped not only by our worldview – ‘our own “little window on the world” ’ - and accumulated theories and experiences, but also by our own distinctive learning styles (ibid., p. 12). That individual learning styles tend to become more fixed with time is an added challenge for all those with an interest in change. Bawden’s own learning (and researching) is shaped by his belief that the focus on short term productivity threatens long term viability, and that agricultural development concerns ‘relationships between people and both their biophysical and socio-cultural environments’ (ibid, p. 18).
Action researching for Bawden, is learning with the intention of generating action whilst also adding to public knowledge. It is a dynamic and cyclical multi-phase process that makes use of the dialectical tensions between the concrete and abstract; action and reflection; integration and separation. Drawing on Argyris’ notion of ‘“double loop” ’ learning Bawden describes his style of researching as involving ‘two sets of experiences and theories’: the first concerns the situation being explored while the second concerns ‘the way we are enquiring into the “first order” issue’ (ibid., p. 21). The ‘reflective’ practitioner must not only come to grips with the techniques and skills associated with each of the various stages within the ‘multi-dimensional’ model, but must also be able to move between stages and loops whilst remaining critically reflective throughout.48

Relevant concerns within the ‘first order loop’ include being involved in complex and ‘messy’ experiences; the consideration of multiple perspectives; developing theories and interpretations of observations and putting theories into action. Questions relating to the ‘second order loop’ include the relevance of our actions in the first loop; the nature of our ‘particular weltanschauung’ (our appreciative system); the ways in which we are thinking, theorising and construing; and ‘the way we are going about the way we are going about our learning’. Throughout these processes we must also be accessing relevant bodies of public knowledge and ‘the bodies of public knowledge on the bodies of public knowledge’ (ibid., p. 22).

Having read and re-read Towards action researching systems I still find the task set out by Bawden to be daunting. Reflecting on my own efforts as a systemic critical action researcher I can appreciate the thoroughness and rigour of Bawden’s approach, the endless questioning and uncovering of thought and action. It is worth remembering that this represents in his own words, ‘dozens of rigorous theories, philosophies and years of experiences (emphasis added)’ (ibid., p. 10). Another action researcher who worked at the Hawkesbury campus is Ray Ison, whose work with David Russell and others has had a significant influence on this thesis. Ison and Russell’s work with farmers in western NSW, described in Agricultural Extension and Rural Development

48 Bawden points out (pers. comm.) that the Hawkesbury model evolved considerably beyond the time of the papers referenced here, that is after 1991.
was shaped by their own critical analysis of extension theory and practice (Russell, Ison, Gamble, & Williams, 1989). Aspects of the theories of cognition, learning and communication that underpin second order R&D, influenced by the work of Vickers, Checkland, Maturana and others, have been discussed in earlier chapters.

Ison and Russell sought to create ‘useful knowledge’ through the ‘joint action’ of both farmers and researchers. The co-creation of knowledge however is not simply a means to an end: what’s particularly important is the nature and quality of the interaction itself. ‘In second-order science’ they write, ‘it is not objects that command attention but the relations between them’, and that applies particularly to the relations between participants, between researchers and farmers (Ison & Russell, 2000, pp. 25-26). Interaction is not only of interest as the generator of meaning but as the measure of our responsibilities towards others.

**Conversation as praxis**

Ison and Russell provide a guide for my research through their emphasis on conversation and relationships, rather than on the ‘facts of the matter’. Conversation becomes not only the central process or method but acts as an ‘overarching metaphor’ for all interactions, not just those deemed as interviews (Russell & Ison, 2005, p. 37). Their work gave me the confidence that opportunities for the co-creation of useful knowledge (and perhaps action) would arise if I paid attention to the quality of the conversations I had with those farmers who agreed to work with me – my co-researchers. As a guiding principle I sought to create a willingness to continue the conversation.

For Greenwood and Levin (2007, p. 71) too the notion of conversation is central to their practice. They align themselves with Rorty’s notion of edifying philosophy and his rejection of ‘“the epistemological project”’ that seeks to elevate philosophy to the role of arbiter of correct knowledge. For Rorty (1989) philosophy is not a search for ultimate truth but an ongoing contest between vocabularies and metaphors that are

---

49 All at Hawkesbury at some time (Bawden pers. comm.).
more or less useful. ‘The point of edifying philosophy’, Rorty writes, ‘is to keep the conversation going rather than to find objective truth’ (Rorty, 1980, cited in Greenwood & Levin, 2007, p. 72).

Influenced by the work of Maturana and Varela, Ison and Russell pay close attention to human emotioning and particularly to the emotion of enthusiasm, believing that all individuals possess a ‘reservoir of unexpended energy or excitement’ that is a valuable resource for collective action (Ison & Russell, 2000, p. 142). One of the triggers for enthusiasm they employ is to engage people in telling their own stories. In listening to narratives and identifying where the storyteller’s enthusiasm lies it is particularly important that people are listened to with acceptance for their thoughts and actions. For Schön (1979) storytelling is revelatory in that it helps us ‘to discover our frames and the generative metaphors implicit in our frames’. This value of respect requires that the model in which issues of importance are identified by ‘outside’ experts is replaced by an understanding that participants are the most appropriate judges of their own situation.

Patricia Shaw (2002, p. 10) recognizes the transformative potential of conversation while suggesting that dominant models of communication, particularly within organizational management, direct us towards the ‘tangible products of conversation’ such as outcomes and designs. Shaw however, drawing on the work of Shotter among others, argues that it is the act of conversation itself that changes and sustains groups and organizations. These ‘everyday’ and ‘informal’ exchanges offer endless opportunities to re-imagine organizational life despite their being rendered ‘rationally invisible’ by more dominant perspectives.

**Social learning and SLIM**

Ison was also a member of a multi-national research group investigating social learning as a policy instrument for water management, SLIM (Social Learning for the Integrated Management and Sustainable Use of Water at Catchment Scale) (see Ison, Steyaert, Roggero, Hubert, & Jiggins, 2004). SLIM researchers recognized the limitations of conventional policy approaches to resource management based on
regulatory, educational and market mechanisms that are underpinned by instrumental reasoning (see Figure 3.2). They proposed an alternative approach, social learning, based on the idea that ‘sustainable and regenerated water catchments are the emergent property of social processes and not the technical property of an ecosystem’ (Ison et al., 2007, p. 500). It is thus through interaction: learning, negotiating, formulating issues and taking action that ‘desirable’ catchments arise. The centrality of interaction means that the quality of relationships is a fundamental concern. For the SLIM project this is manifested in respect for stakeholder’s knowledge and ways of knowing (challenging the primacy of expert knowledge) and in adherence to non-coercion.

SLIM operated in situations best understood as resource dilemmas (Blackmore, 2007); situations that require a willingness to explore a variety of approaches, to accept (and perhaps encourage) multiple perspectives, failures and uncertainty. Dilemmas tend not to be resolved through an appeal to the facts or through the regulatory and hierarchical approaches outlined in figure 3.2. Schön (1979, p. 256) describes the situation in similar terms:

Our debates over social policy turn often not on problems but on dilemmas. The participants in the debate bring different and conflicting frames, generated by different and conflicting metaphors. Such conflicts are often not resolvable by recourse to the facts – by technological fixes, by trade off analyses, or by reliance on institutionalized forms of social choice.

For the SLIM researchers however dilemmatic situations can be ‘transformed’: behaviours and practices can change along with changes in perceptions and understanding when stakeholders operate in a ‘conducive situation’ (The SLIM Project, 2004, p. 18) The particular kind of collective learning and acting required to transform situations is described as ‘concerted action’; making deliberate use of the metaphor of a concert and highlighting the interdependence of numerous actors to achieve a desired outcome (Blackmore, 2007, p. 516).

For the SLIM researchers the nature of knowing and learning are of particular interest. Following Wenger, Blackmore describes learning as being pervasive and inevitable, and a reflection of our social nature. Operating on this view of learning, acknowledged as simply one of a vast number of theories regarding the nature of
learning, SLIM researchers were able to focus more ‘on processes of interaction in practices in catchments than explicitly on learning (ibid., p. 518). The SLIM project provided further evidence for the potential of learning-based approaches to engage positively with messy environmental issues that are not conducive to the application of instrumental reasoning. I needed no persuading that the theoretical foundations and methods applied were both reasonable and coherent; the many arguments presented were compelling. My emotional responses however were a mixture of excitement and anxiety. I felt I had found an approach that was appropriate to my situation and in keeping with my values and beliefs. I was also aware that as a lone novice researcher I sometimes felt I had little idea what I was doing.

Social learning for Woodhill\textsuperscript{50} (2002, p. 323) is ‘concerned with the ways in which different individuals, or groups (actors) within society engage with each other to understand, contest and influence the direction of social change’. It is as much concerned with politics, with the nature of institutions and forms of governance, as it

\textsuperscript{50} Another former Hawkesbury worker (Bawden pers. comm.).
is with the nature of the biophysical world. One of the failings of Landcare in Australia, Woodhill argues, is that the political and structural perspectives have not been adequately recognized and engaged with. Among the elements he identifies as necessary for the facilitation of social learning is methodological pluralism, underpinned by a critical consciousness ‘of why a particular methodological approach is being followed in a particular situation and what the underlying epistemological assumptions are’ (ibid., p. 326). Social learning, as the SLIM researchers make clear is not one approach but many.

I have outlined in this thesis so far my understanding of the situation I was working in, as being inherently social as much as biophysical, as a situation best understood from a multiplicity of perspectives that are themselves being actively constructed and re-constructed. In these circumstances a constructionist epistemology is the appropriate choice. I have also described a number of methodological traditions that appealed to me as both appropriate to my understanding of the situation and to the relationship I hoped to develop with my co-researchers, while being congruent with my values and beliefs. While confident of having made the ‘right’ choices I felt like one of the practitioners described by Schön who enters ‘the swampy lowland, deliberately immersing themselves in confusing but critically important situations. When they are asked to describe their methods of inquiry, they speak of experience, intuition, or muddling through’ (Schön, 1995a, p. 28). Just how I muddled and what knowledge and understandings we created in the process, are the subject of the next chapter.
Chapter 4: On the road

In the preceding chapters I have tried to make clear the ideas that have shaped my thoughts and acts. What I did in the field, what I found, or rather in keeping with the methodology outlined previously, what we created together, is the focus of this chapter. The course of my research has followed a meandering and occasionally improvised path, responding not only to my evolving and emerging interests but to those of my co-researchers. I have ‘collected’ a considerable wealth of data in the form of transcripts, notes and figures and have chosen to discuss only some of these. As an experiment, or perhaps a series of experiments in action research, my goal has not been, as Stringer (1996, p. 143) puts it, ‘the production of an objective body of knowledge that can be generalized to large populations’. Rather, my intent has been ‘to build collaboratively constructed descriptions and interpretations of events that enable groups of people to formulate mutually acceptable solutions to their problems’. The focus of this chapter is on what happened in this attempt to construct and act: combining the ‘first order loop’ of involvement in the dynamic and messy experience with the reflective consideration of the ‘second order loop’ (Bawden, 1991).

If only for pragmatic reasons however, the data collected provides me with an opportunity to examine issues of interest, which may or may not have been directly linked to the formulation of action. Some of these issues are the subject of the next chapter.

Beginning

My project began with the idea of investigating whether a participatory approach to understanding and monitoring soil health could improve farmers’ management capacity. I’d had a longstanding interest in farming soils and their management and there was plenty of literature available on soil health and participatory approaches to resource management, much of it Australian (Hamilton, 1998; Lines-Kelly & Jenkins, 2006; Pankhurst et al., 1995). It was with this intention that I began field trips to the catchment of the Bremer River which meets the Southern Ocean at the town of
Bremer Bay in Western Australia (WA) (see Appendix 1 for further details of the study site).

Soil health was also a concern for the South Coast Regional Initiative Planning Team (SCRIPT), the regional body for funding and coordinating natural resources management, later to become South Coast Natural Resource Management (SCNRM). SCRIPT (2005a) had identified several risks to soil health in the region, including subsurface acidity, water repellence, phosphorous export, salinity, waterlogging, structural decline and subsurface compaction. For each of these threats there were associated resource condition targets (RCTs) and preferred management options within an overarching management action target (MAT) of implementing soil health initiatives on 100 farms per year from 2007 to 2010. I secured some funding from SCRIPT despite my sense that our interests and understandings of soil health might diverge.

On my first trip I attended a meeting of the Fitzgerald Biosphere Group (FBG), a not-for-profit community organization funded largely by state and federal agencies, which works on local production and resource management issues. I spoke briefly, outlining my project and my hope of recruiting farmers as participants. As the meeting broke up I was approached by Marie51, who told me that her husband Stuart would be very interested in talking about soils. While I was happy and relieved at the time that someone had expressed an interest, reflecting on this conversation was one of several experiences that led to significant changes in my work.

If the interests of Marie and Stuart were any indicator, pursuing the topic of soils would mean dealing largely with men. Despite the growing involvement of women in farming and Landcare activities, it seemed that soil management remained men’s business. Until this time I had given little or no thought to questions of gender; I would simply deal with whoever was prepared to be involved. Yet I was uncomfortable with the thought of farming women being excluded simply because they appeared not to share my interest. Looking back it appears remarkable that I showed so little foresight; my focus lay with what I thought was important. While

51 In accordance with the confidentiality requirements of my research all names used are pseudonyms.
professing an interest in participation and power relations I had failed to recognize how my choice of a research interest, and the act itself of deciding upon a topic of interest before I had spoken to any potential participants, would prefigure the relationships between us.

While I had no wish at this stage of abandoning the topic of soil health it became obvious that if I wished to engage all the members of a farming family I might need to rethink my approach. Throughout the recruitment process I told potential participants that my interest was in learning about their assessment and management of their soils with a view to the collaborative development of new soil monitoring methods. Two of the farmers I met at the FBG meeting became participants in the project and provided the names of others in the area who they felt might be interested. Recruitment required several trips and many informal conversations with five farming couples, of whom four agreed to become involved. By this stage I had dropped my plan to speak to as many farmers in the catchment as I could. Clearly the idea was not only impractical but belonged to a research tradition that was becoming less and less appealing. Working with a small and ‘unrepresentative’ sample of farmers in the catchment would in no way invalidate their knowledge and experience. And if we had any chance of developing any practical outcomes as a group there were obvious advantages in keeping our numbers fairly small.

**Trial interviews**

The first trial interviews I conducted were with two ex-farmers I knew at my bowling club, Merv and Bill. My first plan was to use a semi-structured style of interview based on the questions Lobry de Bruyn and Abbey (1999, 2003) asked in their study of farmers’ soil sense and understanding of soil health. I was impressed both with their approach, which was critical of the quantitative and de-contextualized nature of most soil health research, and with the quality of the responses captured in farmers’ descriptions of their soils and their work. Their interview schedule provided something of a security blanket and put me on the safe and established path of modifying an existing published method. I was at this time though questioning the idea that soil health should be the main topic of discussion simply because I was
interested in it and its importance was recognized in the academic and agency literature.

Aside from an interest in farming and bowls Merv and Bill appear to have little in common. Merv is something of an extrovert, often heard joking and chattering both on the green and off while Bill is well known as a man of few words and at the time was someone I barely knew. I approached my first trial interview with Merv thinking that I would set aside a prepared set of questions and instead would let our conversation find its own path. Within five minutes I had a list of topics and follow up questions that had arisen with little or no direct prompting. Not only did I have no need for any prepared questions to keep our conversation flowing, but in my notes I held the outline of interests and experiences that for Merv were full of meaning. The interview with Bill was perhaps harder work but we conversed for the best part of an hour around topics that arose as we talked. Author and journalist Helen Garner describes a similar experience with loosely planned interviewing:

You approach each interview fearing that you will not get enough. But what you learn is that you must humble yourself before the other. You have to let go of your anxious desire to control and direct the encounter. You have to live for a while in the uncertainty of not knowing where it’s heading. You don’t lead. You learn to follow. And then you are amazed at what people are prepared to tell you.

People will always tell you more than you need to know and more than they want you to know. This is not only because you are alert to their body language as well as their speech. I think it’s because most ordinary people can’t really believe that anyone else is interested in them. (Garner, 1996, p. 11)

I completed a further trial interview during a visit to the study area. Having found that a very loosely structured style had resulted in rich conversations with Merv and Bill, I used the same approach with a young farmer whose girlfriend worked for the FBG. I had never met John before but he kindly agreed to be another guinea pig. John was perhaps in his mid twenties and was somewhat nervous. Making conversation was not surprisingly harder work than it had been with Merv and Bill, but despite his reticence and our lack of any previous contact we still managed to

---

52 Merv and Bill are pseudonyms.
spend an hour or so talking about a fairly broad range of subjects around his experience of farming in Jerramungup.\footnote{Jerramungup, approximately 100 kilometres north of Bremer Bay, is a town of less than 400 people that provides a range of services for surrounding farming communities and contains the office of the FBG.}

**My co-researchers**

The eight people who became my co-researchers were a self-selecting group who were not only interested in soil management but were also open to new ideas and new ways of working. They all lived and farmed in fairly close proximity within the Gairdner district, just to the north of Bremer Bay. Marie and Gareth and their respective spouses became involved and also provided the names of others in the district they thought might be interested. Establishing the final group followed a series of informal conversations over several trips to the area and the eventual signing of participant consent forms, in accordance with ECU ethics procedures.

Throughout the project Marie was enthusiastic, engaged and very hospitable. We developed a very easy rapport and I always looked forward to our conversations. Marie’s husband Stuart was a very different personality, far quieter and more reserved. They were relatively new to the area and to farming, and being in their 40s were the youngest couple. Stuart had worked in the area for many years as a shearer, buying blocks of land in the hope of becoming a farmer. He was a close friend of Tony, another member of our group, who provided Stuart with considerable help and the loan of machinery when he was getting started. Stuart and Marie were both disillusioned with ‘conventional’ chemical farming approaches and felt they were inimical to good soil health. Stuart has been pursuing an alternative approach to soil management in line with the work of Neil Kinsey\footnote{Neil Kinsey is the author (with Charles Walters) of *Hands-on agronomy* (2006) and has run several workshops for farmers in Western Australia. His work is based on that of the pioneering soil scientist William Albrecht (1989) who wrote of the dangers of soil degradation and ‘chemical’ farming to crop, animal and human health in the USA during the first half of the twentieth century.}, the American author and consultant.

Marie gave me Tony’s name and told me he was very interested in learning more about the life in his soils. Tony was also an enthusiast with strongly held opinions that he was willing to share. He was much more of a talker than Stuart and always happy...
to chat when he had the time. Aside from his farming interests we talked often about the footy club and the importance of sport to the community. Like Marie and Stuart, Tony was a keen birdwatcher and we spent some time trying to identify a bird he had photographed that had flown into a window, and recovered. Tony had grown up along the south coast and bought the farm in 1977, so that he had seen a lot of changes in the district and had experienced the devastating dust storms that scoured the landscape in the early 1980s (Harper & Gilkes, 1994). The experience led Tony to become heavily involved in the development of no-till seeding techniques that have been widely adopted throughout the grain farming regions of Western Australia and elsewhere. A few years after buying the farm Tony and Kate were married. Kate teaches at the Gairdner Primary School and is quietly very passionate about a range of environmental issues. I saw much less of Kate than I did of Tony but always found her comments very thoughtful. For our interview Kate prepared herself with paper and pencil as if taking an exam and told me she didn’t know much about soils. She seemed a little defensive at first but soon became more relaxed, telling me when we’d finished that it hadn’t been as difficult as she thought it would be.

Originally from South Australia, Gareth came to Gairdner in 1968. Having seen the damage caused by flooding to land with little or no remnant vegetation, Gareth was determined to retain tree cover on susceptible areas when he cleared some of the conditional purchase (CP) block he bought in 1970. Gareth is well known along the south coast for his work on numerous committees, starting with the Landcare Conservation Committee in 1986. I sought in our interview to make use of this experience and his observations of the changes to the area brought about by clearing and the establishment of new farms. Gareth sees himself as a bit of an innovator and hopes to demonstrate new techniques that will be both profitable and ecologically restorative. Juliette, Gareth’s wife, also hails from South Australia where her family were involved in farming. They met though in the WA town on Manjimup where Juliette had her first teaching job. It is hard to overestimate the contribution of women school teachers to rural Australia, so many of whom have left their home towns and married into new communities in often unfamiliar surroundings. Juliette too has been involved in various local organizations and was at the time a councillor
for the Shire of Jerramungup and involved with South Coast Natural Resource Management (SCNRM). At a time when Juliette was becoming increasingly involved in various organizations, Gareth was stepping back from his commitments and hoping to spend more time on the farm. My conversations with Juliette often felt a little formal although she was always welcoming and never failed to offer tea and a bite to eat. They were both very comfortable being interviewed and between them there was little they didn’t know about the district and the history of natural resource management in the area.

The last couple were relative newcomers to the district, buying their farm in 1996. Graeme’s family had been involved in farming in southern New South Wales and Graeme had farmed on and off for much of his adult life. He was driven by a very strong sense that food quality was central to good health and that as producers of food, farmers had a responsibility to grow food of the highest nutritional quality. Graeme was well aware that most farmers did not share this view and felt that ignorance and an excessive concern with profitability made it unlikely that his sense of responsibility would be taken up more widely. I had several lengthy conversations with Graeme, over lunches and in paddocks, regarding the politics, economics and ethics of farming. He revealed a deep knowledge of these subjects; his opinions were always considered, plainly stated and firmly held. And I tended to agree with him. All of my co-researchers were motivated and passionate but the depth of Graeme’s commitment to doing the right thing was particularly impressive. Trish was a livelier personality and shared many of Graeme’s views if not his love of farming. As with the other women, Trish found herself living on a farm because farming was her husband’s passion. Her recognition of the more problematic nature of rural women’s identity and the fact that she worked part time in Perth, meant that Trish offered a slightly different perspective to those women who were perhaps more ‘established’ in the district. While not drawn to farming itself Trish was very keen to spend more time in Gairdner and to become more involved with the life of the community.

The role of farming in health is considered in a little more detail in chapter six.
Having completed recruitment I began the process of arranging and recording an interview with each of my eight co-researchers. In keeping with the methodological values and goals outlined in the previous chapter the interviews were intended to serve two broad purposes: to provide me with a better understanding of how my co-researchers understood their situation and to help us to get to know each other. With the insights gained from my trial interviews and buoyed by Fell’s (2000, p. 507) injunction that ‘An open mind is at least as useful as a clear plan’, I approached the interviews with few prepared questions, confident that together we could create a conversation rich with meaning. It is impossible to write about these interviews or my intentions free from the influence of my subsequent reading of Shotter (1993) and others on the functions of conversation.

The interviews were conducted over the course of three separate trips and all took place at the interviewee’s house. There was no particular order to the interviews; it was largely a matter of convenience depending on who was available at the time although a number of interviews were arranged prior to my visits. All interviews were recorded as audio and later transcribed with a copy of the transcription sent to each interviewee for their comment or review. Using the approach outlined above each interview lasted somewhere between one to two hours. I found the process to be largely enjoyable and together we appeared to have little trouble in finding topics to discuss. As the sole interviewer I found myself trying to perform several tasks. While listening carefully to identify further questions and potential topics of discussion I was also trying to maintain an emotional engagement, to pay attention to what was happening ‘outside’ of the words themselves. I was aware of using various techniques to build rapport: repeating some of the words used by the interviewee or matching the rhythms of their speech but found that these required minimal attention. In most cases we had already met and spoken on several occasions and a degree of rapport had developed. By the time of the interview my co-researchers were all distinct personalities to me; I knew a little of their backgrounds, their history in the district and some of their particular interests, all of which was useful to me in approaching the interviews.
What I was less prepared for was how tiring I found it. Concentrating on several concurrent tasks for an hour or more was hard work. Beyond about an hour and a half I would find myself losing track of the conversation and struggling to maintain the intensity of engagement I began with. This could be a little frustrating as on several occasions we found ourselves having rich and interesting conversations after the interview itself was finished and the recording device turned off. After leaving the interviewees house I would stop at the roadside or at the Bremer Hotel and make some notes. I might record some of the main topics of conversation and how our talk ‘flowed’ or not but was also trying to get down some impression of what had taken place as a relationship. Completing two interviews in a day was as much work as I felt able to do well. I finished these days tired, often very happy with how the interviews had gone and with what we had discussed but frustrated that I was unable to talk with someone about what had taken place. Conducting the interviews on my own and travelling alone there was no one with whom I could share impressions, discuss interpretations or explore lines of thinking – beyond the interviewee of course. The merits of two person interviewing teams were obvious (Ison & Russell, 2000).

My concerns over the quality of my reflections on the time I spent with my co-researchers extend to my project more generally. I could have done far more throughout the life of my project to develop a group of peers, both within and outside of my academic interests, with whom I could share and discuss my thoughts and experiences. There are several factors that might have contributed to this. Academic researchers and practitioners of a conversational or social learning approach to environmental issues appear to be few in number. I was fortunate enough to develop an intermittent conversation with Ray Ison both in person and by email and gained much from these exchanges. Consistent with Maturana’s conviction that conversation is powerfully shaped by emotion my lasting impression of talking with Ray Ison was of a mixture of relief and freedom and the pleasure that comes with feeling understood, feeling that your words might trigger the same sorts of thoughts in others that occur internally. Over lunch I recall Ray’s Open University colleague Rose Armson explaining how difficult it had been for her to find others with whom she was able to talk freely about her interests and ideas. This difficulty is
compounded by the fact that to work together requires not just some overlap in interests but the establishment of an emotionally agreeable relationship.

This is not to make excuses. I found that my engagement, and my interest in engagement with peers with a view to talking about my work, waxed and waned throughout my project. At times I cultured a view of myself as something of an outsider, as someone whose interests were shared by few. I convinced myself that there was little point in talking with others in any detail about my work because they simply wouldn’t understand. Without wishing to go any further with psychological self-assessment this is clearly not a productive outlook for any researcher. It is also clear that I am very much a part of a research tradition or traditions with a well-established history.

The trouble with transcripts

The argument made in previous chapters, that the essence of conversation lies more in the relating between speakers than in the words themselves, raises concerns about the role of transcripts in research. Transcribing interviews and analysing the transcripts is a well-established practice in a variety of disciplines. Transcripts provide a convenient form of data that is well suited to analysis, particularly if the researcher adheres to a theory of communication as the exchange of coded messages. If, however, utterances in a conversation are seen as a response to a specific situation, they need to be understood in context. Part of the context of any conversation, Shotter (1993, p. 180) argues, is that these ‘responsive meanings are always first “sensed” or “felt” from within a conversation, that is they are embodied as vague, unformulated ‘“intralinguistic tendencies”’. It seems unlikely that such vague tendencies would somehow be recorded or ‘preserved’ in a transcript.

Conversation practitioner Patricia Shaw (2002, p. 10) argues that it is commonplace in the management of change and organizations that the interest in conversation is in its ‘tangible’ products, in ‘action plans’ and ‘strategic frameworks’. Operating with the belief that change should be regarded as an emergent phenomenon ‘in the complex social process of communicative action’ (ibid., p.65), Shaw’s interest is in the
conversation itself. She recounts the accidental video recording of a conversation that all ten participants recalled as being tense and difficult. When several of these people later watched the video they were surprised to find that it was boring and devoid of drama. ‘What we “knew” of that conversation’, Shaw writes, ‘could only be known from within the conduct of it’ (ibid., p. 49).

There is a tendency too in written accounts of research involving transcripts to use quotes very selectively and to edit for greater readability. While this is perfectly understandable and perhaps unavoidable to a point, the likelihood is that the context of the utterance is less than clear and that the sometimes rambling and stumbling nature of everyday talk is rendered clearly and emphatically to support the author’s intention. What may be lost is the sense of the speaker grasping for the right words in the immediacy of the exchange, of the difficulty of assembling words and phrases on the run in such a way that the speaker finds them satisfactory. I have tried at times to preserve a sense of this less-than-smooth aspect of conversation while at the same time paying heed to the reader.

Russell and Ison write of their difficulty in seeing beyond the narrative to focus on the nature of the emotions or emotioning as the determinants of conversations and interactions. While utilizing narrative or storytelling as a way of uncovering emotion: ‘to find out where people’s enthusiasms lie’ (Ison & Russell, 2000, p. 144), they argue that our ‘propensity’ for narrative ‘seduces us into overrating the relevance of the story’s content at the cost of missing the underlying emotion that the story was wanting ... to express’ (Russell & Ison, 2004, p. 44). The value of narratives as data and as windows on emotion and affect remains, however the further removed we become from the experience of the conversation itself and the more reliant we become on the transcript as a record of that conversation, the greater the danger it seems that we lose touch with the flow of emotions in which we were engaged. And if, as Glanville argues, the meaning created in a conversation lies with the

---

56 It struck me while writing this paragraph that I relied heavily on metaphors of bodily actions to try and make my argument. In assembling words and sentences about the difficulty of assembling words and sentences, metaphors appear indispensible: but why these particular metaphors?
communicators rather than their messages (cited in ibid., p. 45), we should be wary in the analysis of transcripts and the attribution of their meaning.

Researchers involved in conversation analysis seek to overcome some of these shortcomings through the use of more complex transcripts which record, among other things, where stresses lie, the location and duration of pauses and descriptions of gestures and movements (see for example Wetherell, 2012). Producing such detailed transcripts was however well beyond the resources available to me, and nor was it my intention to become involved in such detailed conversation analysis. Perhaps more importantly, as Wetherell herself points out, meaning making is a continuous and fluid process. Any interpretation of a transcript or any other account of a conversation or interaction is shaped by the relational dynamic in which the researcher is immersed. While the transcript as an artefact may remain unchanged, the dynamic and contextual nature of meaning making renders all attempts at ‘capturing’ meaning partial and fleeting at best.

**Analysis and notions of rigour**

The interview recordings were transcribed in a fairly rudimentary fashion with an emphasis on what was said. Like the ‘rough’ transcriptions used by Knorr Cetina (1999, p. xv) they are both adequate for the analysis performed and easy to read.

The inexperienced researcher is faced with a diverse literature on analytical approaches to qualitative data. Fortunately there is not only considerable overlap in the basic steps to content analysis (Berg, 2001), there is also plenty of room for flexibility in the application of any one style or school of analysis. As Colaizzi (1978, pp. 58-59) points out, ‘these research procedures of analysis … should be viewed only as typical, and are by no means definitive … both the listed procedures and their sequences should be viewed flexibly and freely by each researcher’. In a similar vein, Connor, Treloar and Higginbotham (2001, p.247) repeat the advice of Patton, who writes that ‘there are no absolute rules except to do the very best with your full intellect to fairly represent the data and communicate what the data reveal given the purpose of the study’. Questions regarding the representative nature of the data aside
these authors seem to provide the researcher with a licence to trust their intuition, ultimately allowing the reader perhaps to decide whether the analysis provides a convincing story.

A variety of techniques for ensuring accuracy and rigour in the interpretation of data are described in the literature. Hancock (1998) for example describes an iterative and reflective process of moving between categories and transcripts and constantly reviewing the categories chosen for particular pieces of data. And Colaizzi (1978) suggests that the researcher returns to the interviewees to validate and review the conclusions reached. Given my previously described interest in the co-generation of useful knowledge Colaizzi’s advice is especially relevant. My experience with the co-generation of knowledge will be dealt with later.

Together with the comparing of the data and its interpretation with the relevant literature, what’s being described here is a process of triangulation, designed to ensure a degree of rigour in research (Connor et al., 2001). Conventional notions of rigour in research however are not particularly relevant for many forms of qualitative research and for action research in particular. The concept of rigour seems to be synonymous with the notion of ‘good’ or ‘proper’ research, but its association with such qualities as detachment, replication, measurability and standardisation displays a strong bias towards quantitative and positivist research. Despite this concern, Davies and Dodd (2002, p.280) retain a belief in the value of rigour in all research, warning however, that ‘the criteria for evaluating rigour must be appropriate to the research and the type of research methods used’. Commonly applied criteria for rigour in qualitative research they argue, are closely associated with those characteristics often regarded as weaknesses in positivist research: specifically ethics, subjectivity and reflexivity. The application of conventional notions of rigour to qualitative research can be both inappropriate and detrimental. In their own research involving in-depth interviews, Davies and Dodd suggest that detachment can in fact be a barrier to research, and seek rather to establish a sense of understanding and empathy.

Lobry de Bruyn and Abbey (1999, on-line version, no page numbers) adopt Chambers’ characteristics of rigour: namely trustworthiness and relevance.
Trustworthiness is the quality of being ‘believable as a representation of reality’ and relevance refers to the ‘practical utility for learning and action’. Positivist notions of rigour such as quantification and objectivism are inappropriate in situations understood as constructed, contested and dynamic. In such cases they fail the test of relevance.

**Coding and modelling**

Having familiarized myself with the various analytical procedures for qualitative data, the transcripts and my notes on the interviews were transferred to NVivo. Faced with the task of coding eight interviews line by line I found myself in the situation described by Berg (2001, p. 251), who writes that ‘inexperienced researchers, although they may intellectually understand the process so far, usually become lost at about this point in the actual process of coding’.

Coding eight interviews was a time-consuming but ultimately interesting process. I began somewhat tentatively, creating a series of ‘free nodes’ for each passage that seemed to hold some meaning or interest. I was already quite familiar with each of the transcripts; I was after all the interviewer in each and had transcribed over half of them. What became apparent though over the course of several weeks of coding and modelling, was how fluid my analysis and interpretation could be.

With each new interview some existing nodes were added to and novel nodes created. Common themes and ideas emerged while each transcript retained its individual character, reinforced perhaps by my memory and experience of each conversation and personality as unique. At times I was surprised by a passage, or rather surprised by my interpretation of a passage that triggered an association or led me to reconsider passages in other transcripts already coded.

After all interviews were coded I printed a node summary for each and noted those nodes that contained the most references. Starting with the summary from Ross’s transcript I began to make connections between the dominant nodes and to develop themes which drew in other nodes. A fairly coherent narrative around ‘place’ and ‘local history’ seemed to develop from this transcript, not surprisingly perhaps given
that I approached the interview with a particular interest in his reflections on the changes that had taken place since he came to the district in 1968 (a model created from this interview appears as Figure 4.1).

The ‘breakthrough’ in being able to re-create some sort of story from individual interviews came with the use of the modelling function in the software. Being able to visualize and move themes and nodes into different spatial relationships enabled me to see connections and to tell stories in a way that was not possible with alphabetically arranged lists. While the plasticity of the model making process enabled me to question and re-imagine the data it became increasingly clear that it was easy to create a narrative form within which all the interviews could be arranged. Creating models and narratives in this way is unavoidably subjective and fraught with difficulty. I sought with each interview to create a model that satisfied Chamber’s notions of trustworthiness and relevance: a model that is believable (particularly for the interviewee) and useful. A danger here is that the model maker errs, unconsciously or otherwise, on the side of relevance by creating a story that suits his or her purpose or interests. Ison and Russell list several potential pitfalls of this kind in the early stages of their four stage strategy for a R&D system, together with the skills required to avoid them. These include an awareness of how dominant narratives and knowledge hierarchies are created and the ability to accept and work with a ‘multiverse of world views’ (Ison & Russell, 2000, p. 211).

While each interview and conversation was distinct in its themes and concerns and - less obviously as a transcript – in its emotional tone, I was alert to certain recurring topics that might provide a basis for collective action. Throughout the period of my fieldwork I was juggling my interest in working towards an outcome with the demands of paying due attention to the process. I sought to examine each interview – the interview acting perhaps as a token of each relationship – carefully and diligently without making hasty conclusions or shaping the analysis to satisfy my own ends. The more I rearranged and re-thought the models however the stronger the consistencies and similarities appeared. The narrative form that began to emerge through my analysis was one of ‘influences’ either supporting positive change or acting as barriers
Figure 4.1: Model created from the interview with Gareth
to positive change, with the tension between influences playing a central role in the broader story of change and the future.

This is clearly a narrative form that suits one of my purposes: to generate action for change. The structure is most obvious in the composite model (Figure 4.2) that was drawn some time after the individual models were completed. How useful the individual models proved to be in co-constructing knowledge and continuing our conversations will be dealt with below. For now I want to take a brief look at some aspects of this overarching narrative that seem particularly relevant: aspects of farming lives that influence change.

Among the influences identified as supporting positive change are the proactive and progressive nature of the local community and the existence of important role models. For some this is manifested in the fact that work gets done to protect the catchment; work that is done not for individual profit but for the community in its broadest sense. For Trish this aspect of the community seems to be related to the relatively recent development of the area for farming:

Well it’s a very welcoming community, some farming places you go to, because they’ve been settled for such long time you have that various strata, that “we’ve been here for so long”, the landed gentry, but here because it’s such a newish [community, there] … hasn’t been that development of that so, it’s a very, seems to be quite a youngish [community, I know in a lot of areas the farming people are quite, you know 50 plus, but here there’s a lot of people on the land quite young … and I think that brings … progressiveness. I think this generally is a fairly progressive thinking area, whether that’s based on need or whether that’s based on the fact they’re young and well educated.

This is not to say that there are no divisions within the district or that everyone shares the values expressed by many of my co-researchers. Kate made it clear that there were significant differences in values between farmers, telling me that ‘I’ve got a

---

57 At the workshop, held several months after the interviews were completed, Rhonda spoke of the high level of cooperation that was very noticeable in the early days of the district and felt this had something to do with it being a new community that was also relatively isolated. While she felt that there remained a high degree of cooperation it is clear from Ross’s interview that other aspects of the social life of the district had changed for the worse.
Figure 4.2: Composite model created to highlight selected common concerns and themes
neighbour up here that recently said to Tony he was quite prepared, he’s got two farms, he’s quite prepared to sacrifice one farm, to ensure you know, he gets the maximum production’.

**Supporting positive change**

Several of the group identified various farming and community organizations as being important contributors to positive change. Two important and influential bodies in the Gardiner district are the Fitzgerald Biosphere Group (FBG) and South Coast Natural Resource Management (SCNRM), the organization responsible for the coordination and administration of state and federal government funds for natural resource management. Opinions among the participants differed regarding the effectiveness and value of these particular organizations but there was considerable agreement that groups of one kind or another play a vital role in working for positive change. One such group was formed in response to the devastating dust storms experienced in Gardiner and other districts several decades ago. The WA No-Till Farming Association (WANTFA) quickly outgrew its roots to become a large national organization and played an important role in the development and adoption of no-till farming. Tony, who was closely involved with WANTFA, suggested that as the organization grew it became not only more difficult to administer but also less effective. His argument was that the members of smaller local organizations are more likely to share similar concerns because they farm similar country. Interestingly he also felt that people working within a small group were more likely to be honest with one another and that a lack of honesty, and an excess of ego, compromises the effectiveness of groups and can result in a failure to convey an accurate reflection of a situation to agencies and researchers. The suggestion, while not explicit, seems to be that relationships between people in a smaller group, where everybody knows each other, are more likely to be better than those experienced in a larger setting.

It seems curious, in hindsight, that I did not see a stronger and more direct role for values and ethics as contributors to positive change when I first drew the composite model. It was clear from the early stages of our engagement, that for my co-
researchers, ethical considerations were central to how and even why they farm. Graeme, for example, was particularly forthright about the role of ethics and values in his actions as a farmer. He saw farming as offering not only the opportunity for independence but also the opportunity to address some of his social and environmental concerns:

"I guess I look at the property, I don’t look at things so much from the financial position, and making money, well I do but not to the same degree; that’s if I can break even and see benefits in what I’m doing environmentally, socially, that’s of as much importance to me as anything else. Yeah, that’s what’s important to me these days, looking at some of the problems in the environment, society, and saying OK, how can I contribute to those by what I do here?"

His sense of social responsibility is driven in part by his conviction that farmers have an important role to play in public health as providers of highly nutritious foods. Any farmer who is aware of this connection, he believes, has an obligation to act on it. For those working to produce farm products of a higher nutritional standard however there is no financial reward to offset the higher production costs. Further impediments to a more widespread application of a civic responsibility by farmers he believes are ignorance and a concern with maximizing returns. When I asked whether he had discussed the idea of social responsibilities with other farmers he replied:

"No I haven’t really because most of them think you’re a bit thick if you start talking that way, most of them are not oriented towards, their orientation is financial, not all but a lot of them. I think, a lot of them haven’t had the exposure to that sort of concept."

Questions of values and ethics arose in conversation with the others more commonly around caring for the local environment. This was considered not only important work but was for some a source of pride, satisfaction and enthusiasm. During one visit to see Marie and Stuart during the early stages of the project, Marie mentioned that they had seen pardalotes in the garden and that she and Stuart had made nesting hollows for them using old fishing floats. They each placed a float in a different spot: Marie’s under the eaves of the house, Stuart’s elsewhere. Marie announced a little
boastfully that her float had been used several times while Stuart’s remained untouched. No doubt there was a little spousal rivalry at play here but this was a story that was told with genuine warmth. We continued to talk about birds for some time. Marie said that they hoped their revegetation work would provide a corridor for birds to move from the river to the farm, adding that Tony and Kate had wrens in their garden. Stuart recounted seeing a large number of white-fronted chats while he had been harvesting canola two seasons ago, noting that their numbers were much lower last year. He thought that the difference might be down to timing, hoping it wasn’t that he had harvested the birds as well. While we talked Tony arrived at the house and said he thought the wrens had eaten all the caterpillars in the veggie garden, that he had seen bee-eaters too and plovers in the paddock. This idle chatter revealed not only a common interest but hinted at the kind of enthusiasm that might see a group of people working together in collective action.

**Barriers to positive change**

In every interview the conversation at some point turned to the powerful effects of financial pressures (see Figure 4.2). The need to make a decent return - to cover inputs and living expenses or to pay off the farm – was seen by many as preventing, or at the very least compromising, the way people would ideally like to farm. As Graeme put it:

*I think, there’ll always be a certain, if you talk to farmers generally, they’d like to do things, they’d like to plant more trees, they’d like to look after their soil better, they’d like to look after their stock better, they’d like to do those things but, the financial pressures that they’re under to produce enough money to cover their costs of operating plus their living to an acceptable standard of living, drives and motivates what they do. And the margins at the present moment have become so tight that most people are not actually making an adequate income to meet their, their reasonable living conditions and maintain their environment in a reasonable condition. You just only have to look at farms generally and the standard of fencing and trees and waterways and dams and things of that nature they’re or maybe they’re not, but it seems they’re*
I will return to the subject of financial pressures and the economic arrangements that shape farming and agriculture in the next chapter.

The interviews reveal a variety of beliefs regarding the contribution of research to the future of farming. While Kate, for example, felt that research would lead to better farming practices, several others were more critical of the activities of important research organizations. Graeme argued that much agricultural research was being driven by commercial interests seeking a particular outcome. The Commonwealth Scientific and Industrial Research Organization (CSIRO), which operated for many years as a research organization, had for him become a ‘commercial research organization … looking for commercial opportunities’. Tony identified a similar concern with the FBG, which he believes has tailored its activities in order to attract funding. He also expressed his concern that too much research has a short-term focus and that together with the need to attract funding, this leads to researchers making safe decisions to concentrate on research that will ‘succeed’. As a result there are fewer risks being taken and little research undertaken over the sorts of time scales that farmers themselves work in. Tony’s experiences with agricultural research and its products have resulted in a profound skepticism and disappointment:

*They introduce stuff, there’s new varieties popping up all the time, and we get them out here, you buy a big heap of it and sow it, and the bloody stuff ends up sprouting because it’s not strong enough in a wet harvest and all this sort of stuff. And then the next thing, we’re criticized for not taking up the new technology. Well we’ve taken up some new technology … and it’s been a waste of bloody money.*

**Making use of the models**

As stated, the broad pattern of my analysis, outlined in the preceding pages, is one of any number of possible analyses. It identifies a pattern or tells a story, or rather stories, that are demonstrably useful to me but which may or may not be useful, relevant or accurate for my co-researchers. I hoped to use the individual models not
only to check for accuracy but also as a means to generate discussion, to encourage the process of the co-construction of knowledge outlined in the previous chapter. I posted to each of my co-researchers a copy of ‘their’ model together with selected excerpts from the transcript, along with some notes on what I hoped they would do with the model. As noted above, a full copy of the relevant interview transcript had already been sent.

I asked my co-researchers to consider whether the model made sense and accurately reflected what they recalled from the conversation. I asked them to check that I hadn’t missed something important and to consider whether the model either prompted new thoughts, or triggered a re-consideration of any ideas or opinions represented in the model. In addition I noted that the feedback I received from them would help me to prepare for the workshop sessions that would be the next phase of the project.

For a variety of reasons the models failed to generate the constructive discussion I hoped they might. On reflection the major failing was that I not only asked for too much, but that I also expected them to consider these questions in isolation. The isolation was not simply geographical in that I remained in Perth and hoped to establish some discussion by phone, post or email, but that throughout the project I needed to do more to help my co-researchers understand my intent and purpose.

Financial constraints meant that I had to carefully consider how often and for how long I could travel to the study area. The duration of each trip and the considerable travel involved meant that I was unable to see everyone on each visit. Opportunities to sit and talk face to face were thus limited and many months could pass between meetings. During these gaps people’s lives were occupied with more important concerns than my project and it was unsurprising that they may have forgotten aspects of the work. An added complication was that the project underwent a significant change in intent when I dropped the focus on soil health in favour of responding to issues that arose through our conversations. While this change appeared to me as both desirable and unavoidable given the reading and thinking that
preceded it, my co-researchers did not have the advantage of going through the same process: how could they? While there’s little doubt that I could have done more to keep the group informed of my thoughts and thinking throughout the project it seems unreasonable to expect that they should ‘see’ things as I do, or share the same degree of interest or concern.

At the time I sent the models I was also preparing the next stage of the project in which I hoped we would develop a plan for action. The discussion that I hoped to bring forth through the models became a victim of time constraints and my inability to develop useful dialogue other than through face to face conversation. I found email useful for little more than arranging meetings and felt reluctant to try and engage people in meaningful conversation over the phone. While I don’t perhaps share Fell’s (2000) enthusiasm for electronic media facilitating dialogue, their effective use seems to require well developed personal relationships and/or a high level of motivation and belief that something worthwhile will come from it.

I did however receive some feedback from the process of interviewing, transcribing and modeling. Most notably Marie sent me a letter a month or so after receiving her model and about three and a half months after the interview:

The sorts of things I picked up from the transcripts is that I am not a very good listener, especially seeing how often you had to ask the same question...sorry.

It was truly novel to have someone sit there and give a good impression that they were interested...for so long...on such a wide range of topics.

I think I did do a big purge ... because I could and I felt conscious that I hadn’t before. So my rambling seemed to me to be all over the place without really explaining anything well.

I wondered about the merit in prioritising the boxes circles or issues once they were down (by me) subjectively and seeing if they matched your graphical version. I have agreed with most of your interpretations except with the one connected to powerlessness and independence ... couldn't see that connection.
Stuart read his and didn't disagree but also said he doesn't understand where you're going with it. Interest factor is pretty low during harvest! I hope we and the weather doesn't stuff your project around too much. (pers. comm. 9/11/07)

While the letter suggests not only that Marie is in broad agreement with my interpretations but that she has taken the time to think about them, I am left with a sense that an opportunity for a more ‘robust’ co-construction of ideas and knowledge was perhaps missed.

It is curious that she takes my repetition of certain questions as a sign that she is not a good listener, that the failing - assuming that there was any failing – was hers. A more reasonable interpretation, from my perspective, seems to be that I repeated certain questions because I was not satisfied in some way with the response. It seems perfectly understandable that Marie may not have understood a question in the way that I understood it. The use of repetition and elaboration to arrive at a satisfactory conclusion to a line of questioning are perfectly consistent with some of the ideas outlined in previous chapters regarding the nature of communication. Why though does Marie feel the need to apologize? Trish too offered something of an apology having read the transcript of her interview, expressing surprise that she had interrupted me so much. To me these instances suggest normal, even healthy conversation. Were these apologies simply due to an excess of good manners or to a feeling that interviews of this sort should proceed along more formal lines: that is, unlike normal conversations?

The connection between powerlessness and independence is explored in more detail in the following chapter. It’s interesting that Marie questioned this link because while both topics were raised during our conversation, we made no connection between them. It was while constructing the model of the conversation that I became interested in what appear to be contradictory experiences. This confirmed for me the creative potential of the use of the models but raised the question as to whether I wanted to use the models to pose new questions or to serve more as an interpretation of the conversation that might be used as a tool for further discussion? How far did I
want to go or should I go in making links between topics and ideas that were not expressly linked during our conversations?

The greater value of the modeling process may have been its use to me as a tool to explore and interpret the interviews in a way that circumvented the linear pattern of the transcript. As a means of sharing my interpretations with my supervisor they were also very valuable. With hindsight the models may have borne more fruit if I had paid more attention to whether their style suited the intended purpose, rather than taking the easy option of keeping to the style dictated by the software. Perhaps a more creative and constructive approach, time permitting, would have been to create the models themselves as a cooperative task: to make apparent not simply the product but also the process of their creation.

The workshop

By the time I had posted a copy of all the models, twenty months had passed since my first visit to the study site to meet potential participants. Realizing that I would soon need to conclude my fieldwork I was keen to bring the group together to see whether we could at least identify possible courses of action.

While planning for this stage of the project I took part in a workshop organized by Valerie Brown that enacted a process for collective thinking and action. The workshop followed four steps: developing a common purpose; describing the situation; designing strategies for what could be; and doing - putting strategies into action (see Figure 4.3). My experience of the workshop was very positive. The process, and Valerie Brown’s facilitation, provided a framework that seemed to work and one that I felt I could use. At the time I thought little of the context of the events that day. I’d been unsure of how to structure the group session I was planning and the four step process provided me with a clear and apparently simple means of proceeding. Clearly though the conference setting provided a relaxed and playful atmosphere where there was little at stake. Not surprisingly the workshop was enjoyable and seemingly

---

58 The Asia Pacific EcoHealth Conference was held in November-December 2007 at Deakin University, Melbourne.
productive. These comments are not intended as a criticism of the process but rather to highlight a certain naivety on my part. Brown’s framework came at a time when I needed to move on to the next stage of my project, but was unsure of how to proceed. My attachment to the framework was as much emotional as rational.

Following discussion with my supervisor I agreed to involve a colleague, May Carter, who is an experienced facilitator. Seven of my eight co-researchers attended the day held at the ECU field station in Bremer Bay. My role was largely that of observer and arranger of food and drinks. I tried to let May decide how to respond to events as they unfolded. I was anxious for much of the day: keen that we should produce what would count as a good outcome yet committed to keeping my interests and opinions to myself as far as possible. This last statement strikes me as somewhat absurd now given that the only reason we were all together was as a result of my interests.

Figure 4.3: Four stage framework for collective thinking and action, adapted from Brown (2008). The focus question for the workshop was: what do I need to live and farm well in the Gairdner district?
Fittingly perhaps, Kate questioned the very basis of our being together when I outlined my hope at the start of the day that together, we could identify some aspect of their/our life and work that we could take action to improve. Why, she asked, did I assume that there was something that needed to change? Kate’s question reveals a dilemma Kemmis (2001, p. 93) describes as becoming a ‘solution looking for problems’. Having initially approached their work believing utterly in the value of their approach whatever the situation, Kemmis and co-workers responded to this realization by seeking out those who had already developed a critical view of their situation and made a commitment to action. I had no such option. Having made my own commitment to a course of action I was relying on the goodwill of my co-researchers and my skills as a facilitator to see the process through.

After some informal introductory chatter May asked everyone to write down their answers to three questions: What is important to you? What do you value? What do you want to see in the future, in regard to living and farming well in Gairdner? (All answers to these questions are presented in Table 4.4.) Among the topics subsequently discussed was the feeling that farming communities are poorly represented, particularly in the media, and that this was contributing to a marked city/country divide. Trish and Graeme in particular expressed a desire for a future in which farmers were more highly valued and where the ‘realities’ of farming life were better understood. The effects of rising production costs for farmers for example, they felt were not widely appreciated. Tony spoke of his considerable frustration regarding the portrayal of rural communities by the media. Despite the considerable efforts that had been made by farmers in the Gairdner district to reduce the damaging effects of dust storms that had tainted the image of the area, he felt that the media continued to portray the area as a dust bowl. In the realm of politics rural Australia pays a double price. Rural representatives are not only outnumbered by those from urban Australia, they are consistently and almost exclusively from the conservative parties. Their vote is largely taken for granted and there exists a broad consensus between the major parties on most issues of rural policy. Both decision and profit-making activities related to rural Australia are concentrated in the cities.
This discussion on the city/country divide also revealed what appear to be contrary if not hypocritical attitudes on both sides. While appealing for greater understanding several of the group expressed a concern that larger numbers of tourists, not only but predominantly from the city, would threaten what they value highly: a very beautiful region of high biodiversity with a ‘pristine’ coastline. At the end of the day Juliette said to May, with a smile, ‘don’t tell anyone about us’. Trish thought it a little ironic that while city people appreciated the beauty and isolation of the area, it appeared to do little to overcome the divide. Unlike many parts of Europe for example, working rural landscapes are not popular tourist destinations in much of Australia. Tourism in Western Australia’s south-west is largely confined to the coast and to ‘boutique’ farming areas, mainly wine growing regions, which boast restaurants and other amenities. Most of the mixed extensive farming area referred to as the ‘wheatbelt’ is both sparsely populated and little visited.

A subject that generated considerable interest was the importance and difficulty of involving the younger generation in more community activities. Marie recounted a curious experience while doing survey work in the area for an environmental organization. Expressing a desire to involve some younger people in the work, she was told, by whom it was not clear, not to ‘overload’ them. She was told that it was more important that they stayed in the area and that if and when they started a family, that was the time to involve them in the community. This rather startling remark betrays a fear, not on consideration so surprising, that many younger people will leave the area and not return. The point was also made that many younger people had a stronger sense of community with Perth, 500 kilometers away, than with the local area.

Concern over the loss of younger members of the community appears well founded. Alston and Kent (2009) argue that young people throughout rural Australia are experiencing rising levels of social exclusion that drive out-migration in search of

59 In their survey of Landcare groups in Western Australia, Simpson and Clifton (2010) report widespread concern over the lack of younger members, which has obvious implications for the future of many groups. They also note a lack of recognition of this issue within the Landcare literature.
employment and education. Stressors on rural communities resulting from policy and structural changes have, they suggest, disproportionately affected young people, who in addition, are less likely to recognize these systemic effects and more likely to blame themselves for perceived failures. The alienation and exclusion felt by young people in rural areas is reflected in high rates of suicide and mental illness, substance abuse and violence (ibid.). That Australian farmers are ageing is confirmed by the Australian Bureau of Statistics (ABS). Over the years between 1981 and 2011, the proportion of farmers below 35 dropped from 28% to 13%, while those aged over 55 years increased from 26% to 47% (ABS, 2012).

During this discussion a combined set of responses to the three questions posed earlier was drawn up. Prior to breaking for lunch the group identified those responses/concerns that they felt were currently being satisfied or achieved (see Table 4.5). Not surprisingly, given the nature of the discussion outlined above, profitability, sustainability and being valued and appreciated were among the concerns not being satisfied. Despite my concerns that we were not adhering tightly to Valerie Brown’s four step framework outline above, May felt that we had spent enough time discussing the current situation and should move on after the break to looking at what could be. The group was split into two smaller groups, with couples separated, and asked to develop a list of possible responses to the concerns raised earlier. Reforming as a single group the responses were listed and discussed and a core set of ideas emerged that seemed relevant and worth pursuing (see Table 4.6). This list not only identified several courses of action but clarified major concerns about their future, living and farming in the Gairdner district.

The most tangible action to emerge from the discussion was to use the local paper the Gairdner Gazette to share news of local achievements, to gauge interest in some of the ideas generated and also as a possible site for a web-based register of local expertise. Trish had recently become the editor of the Gazette and seemed enthusiastic about putting some of these ideas into action.
<table>
<thead>
<tr>
<th>What is important to you?</th>
<th>What do you value?</th>
<th>In regard to living and farming well in Gairdner, what do you want to see in the future?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juliette</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business opportunity – own profitable farming business</td>
<td>Fresh air</td>
<td>Able to maintain successful farming business and community infrastructure to support them i.e. roads/recreational facilities</td>
</tr>
<tr>
<td>Able to raise family in a nice environment, and establish worthwhile values</td>
<td>Nice environment</td>
<td>Coastline not ruined by development and tourists.</td>
</tr>
<tr>
<td>A place where your family wants to come home to</td>
<td>Safe place</td>
<td></td>
</tr>
<tr>
<td>A good community to socialize and work with</td>
<td>Close to pristine coastline – R &amp; R – fishing- a nice place to spend time with friends and family</td>
<td></td>
</tr>
<tr>
<td>To have a sustainable farm</td>
<td>Be surrounded by nature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Own food source – meat, fruit and veg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fresh drinking water</td>
<td></td>
</tr>
<tr>
<td>Marie</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social connections</td>
<td>The complexity and biodiversity of our bush</td>
<td>No degradation – in community networks – farming practices – in our environment</td>
</tr>
<tr>
<td>Pride in where we live</td>
<td>The lack of population – more people means more harm</td>
<td>I want our children to know much about where they live and cherish the legacy of what they learn to be taken to any environment anywhere</td>
</tr>
<tr>
<td>Learning about where we live – ongoing</td>
<td>I value a safe place for our children</td>
<td></td>
</tr>
<tr>
<td>Not to harm where we live</td>
<td>I value a healthy place for all of us</td>
<td>I want us all to stay healthy</td>
</tr>
<tr>
<td>Stuart</td>
<td>Family</td>
<td>Lifestyle</td>
</tr>
<tr>
<td>----------------</td>
<td>--------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self-employment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trish</th>
<th>Self-directed, achieving life satisfaction (reliant on income, lifestyle, opportunities etc.)</th>
<th>Land, wildlife, flora/fauna</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sense of personal identity – control</td>
<td>Community</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relationships (personal)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I want external forces (corporations, city people) to value what we are doing here (looking after land, food production), recognize the difficulties, better returns for efforts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graeme</th>
<th>Equity</th>
<th>Health</th>
<th>Sustainability</th>
<th>Appreciation, valued – understanding of actuality by society</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Synergistic interaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vista/panorama</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Understanding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Synergistic interaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Diversity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Diversity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Improved sustainability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Better utilization of resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>More appealing appearance of farming enterprises/community understanding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(climate/energy?)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(rural/city impacts)</td>
</tr>
<tr>
<td><strong>Kate</strong></td>
<td><strong>Health</strong></td>
<td><strong>Safety</strong></td>
<td><strong>Happiness</strong></td>
<td><strong>Prosperity</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Honesty</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Commitment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Effort</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sincerity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Justice (not greed)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Community working towards common goals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Preservation of what we have – our natural resources, protecting limited resources</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Recognition of the sacrifices we make, by government</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Nationally that we retain what is unique to this country</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Tony</strong></th>
<th><strong>Family, lifestyle</strong></th>
<th><strong>Honesty and support</strong></th>
<th><strong>Stickability</strong></th>
<th><strong>Caring for our surroundings</strong></th>
<th><strong>Personally – to be able to come and go from my patch at leisure</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What emerges very strongly is a desire to build a community with high levels of cooperation, sharing and participation, a community that makes efficient and effective use of local resources and recognizes and celebrates their achievements. While at times during the day there was a lot made of the real difficulties of enacting useful change and an acknowledgement that major changes, including the development and adoption of sustainable farming practices, were needed, there was a strong sense that changes within the local community could be made and needed to be made. What is striking for me is that what began as a project with a more technical interest in monitoring and understanding soils, developed into a concern with the workings of the community. It is apparent that institutions involved in rural issues in Australia largely regard farming communities as producers of commodities first and as communities of people a distant second. As Alston (2012, p. 235) puts it, ‘there has been a historical trend to view rural policy as indivisible from agricultural policy and this has resulted in a lack of attention to the social needs of people engaged in or supporting agricultural industries’. This oversight, conscious or not, is replicated through institutional engagement with regional communities in Natural Resource Management (NRM) where an insistent biophysical framing of situations, rendered in statistics (consistent with governmental preference for a readily quantifiable basis for policy making (Tonts, Argent, & Plummer, 2012)), regards social outcomes as a means to an end. As Wallington and Lawrence (2008, p. 285) write: ‘Lay perceptions of environmental and sustainability issues, articulated by farmers and lay publics alike, relate more to issues of efficacy, social justice and quality of life than to quantitative indicators generated by science’. The responses listed in Tables 4.5 and 4.6 seem to confirm this argument. Asked to consider what living and farming well in Gairdner means, there is a strong concern with being part of a community in which there is cooperation, safety and security, opportunities for learning and interaction, a valued place for the younger generation and a degree of understanding and regard for the role farmers’ play as growers of food and managers of the land. Considerable value is also attached to the physical environment, in particular to the coastline and the extraordinary biodiversity of the region.\(^{60}\) These concerns are in addition and not

\(^{60}\) See appendix one for a description of the study site.
Table 4.5: Aggregated responses to three questions following discussion - ✓ indicates belief that item is already being satisfied; ? indicates some uncertainty or disagreement among participants (workshop 28/2/08)

<table>
<thead>
<tr>
<th>What is important to you?</th>
<th>What do you value?</th>
<th>In regard to living and farming well in Gairdner, what do you want to see in the future?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pride in where we live ✓</td>
<td>Healthy and safe place ✓</td>
<td>Media, being heard and being valued</td>
</tr>
<tr>
<td>Learning about where we live (ongoing) ✓</td>
<td>Own food source ✓</td>
<td>“Others” to value us</td>
</tr>
<tr>
<td>Health and Safety ✓</td>
<td>Opportunities, places for social interaction ✓</td>
<td>Leadership</td>
</tr>
<tr>
<td>Lifestyle ✓</td>
<td>Pristine coastline ✓</td>
<td>Nurture young generation</td>
</tr>
<tr>
<td>Self employed ✓</td>
<td>Space - isolation ✓</td>
<td>Involvement of younger generation</td>
</tr>
<tr>
<td>Family – children can return ✓</td>
<td>Community – cooperation ✓</td>
<td>Maintain farm businesses and community infrastructure and services</td>
</tr>
<tr>
<td>Satisfaction – Personal</td>
<td>Freedom ?</td>
<td>Recreation</td>
</tr>
<tr>
<td>Being appreciated and valued for our contributions by society (representation in media)</td>
<td>Local biodiversity and complexity</td>
<td>Protect coastline</td>
</tr>
<tr>
<td>Equity in treatment</td>
<td>Stickability – commitment</td>
<td>Less greed</td>
</tr>
<tr>
<td>Personal identity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freedom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Financial concerns)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Equity, equitable returns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- profitability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- viability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- prosperity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainability and Environment, health of society and environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People in the community</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
subordinate to the fundamental need for viable and sustainable farm businesses. Given the opportunity, this particular group of rural dwellers describe their situation and their priorities in a manner more consistent with Vickers’ (cited in Blunden, 1985) idea that a working community is a community of people first, who happen also to mine coal, or in this case to produce agricultural commodities.

At this point in the day it was clear that many people were tiring and I was keen to get some feedback on events before we finished. Stuart, who was quiet for much of the day, remarked that while he had not expected to be talking about communication, imagining more of a technical focus, he was happy with the outcome. Graeme admitted that while he’d had similar expectations to Stuart, he felt that the actions identified were more achievable and had the potential to lead to more technical developments in the future. Marie expressed what seemed to be a widely held view that people had limited time available for new projects and that any achievable action would need to fit into already busy lives. Most people seemed to feel that the ideas discussed were manageable and ‘not too burdensome’. Aside from the actual ideas it was noted that the day’s activity had provided a useful forum for discussing ideas and concerns and that the act of communicating as a group had the potential for generating ideas and action. It became apparent too, following a question from May, that this was the first time that these issues had been talked about in a group setting. What we had been doing together was an example of the kind of social cohesion that we had recognized as an important part of building a desirable future.

And then?

We finished the day with an understanding that we would try to remain in contact by email and arrange another group meeting if and when we felt it necessary. The workshop left me exhausted but very encouraged with what we had achieved in a day and the spirit in which we had worked together. I was keen to consolidate the work we had done and as part of this I wrote a short article for the Gairdner Gazette describing the project and my approach as a researcher (this article is reproduced in Box 4.7). Over the following days and months my enthusiasm was tempered by a
sense that we were still far from taking any collective action and that with seeding on
the horizon, we had a fairly brief window of opportunity in which to act. It was also
becoming clear that at this point, more than two years after my first trip to the area, I
needed to arrange my withdrawal from the project.

Over the next two months I talked with six of the seven people who attended the
workshop, by phone or in person. While most were happy with the outcome of the
workshop, if a little surprised at the community focus, and felt that some of the
identified actions at least were feasible, Marie was disappointed. In spite of her
general enthusiasm for the project and for conversation and learning, the outcomes
were not something she felt excited about. She was also concerned that the men in
the group were disappointed that the focus was not more ‘farm-oriented’ and that
perhaps I should give the group the opportunity to think again about possible courses
of action. Interestingly Tony and Graeme expressed no such disappointment to me,
although I never managed to speak with Stuart about it. As we chatted Marie
admitted that while issues of communication and cooperation were important they
were not very glamorous: they were hard work. She recounted the story of a couple of
Australian sheep stud owners, who while travelling overseas, told their contacts that
they would not phase out mulesing when the official industry line was to the contrary.
Their comments had resulted in the cancellation of several deals and Marie was
perplexed as to their actions. She also told me that issues of communication and

Table 4.6: Responses to the question of what could be, following discussion (Workshop
28/2/08).

- Recognize and celebrate community achievements through local (e.g. Gairdner Gazette)
  and other media and communication networks
- Leadership: find a footy coach; mentoring and spreading responsibilities; increasing
  community participation
- Provision of information and advice on marketing, agronomy and budgeting
- Improve local sharing of knowledge and skills. Develop a web-based register of local
  expertise, may also be used to coordinate/circulate information between various
  community groups. Develop a barter system to make use of local resources
- Lobby for improved mobile phone coverage, regarded as an important tool for business
  and safety reasons
Box 4.7: Social learning as an alternative approach to managing natural resources, article submitted to Gairdner Gazette.

One of the founding principles of social learning is that positive outcomes in the management of natural resources emerge from social processes, that is from learning, communication and cooperation, rather than as a result of the application of technical solutions. This emphasis on process however is not at the expense of action; practitioners such as those working on the European Social Learning for the Integrated Management Project (SLIM) are developing practical tools alongside theory to address water catchment issues across five countries.

Conventional resource management proceeds from an adherence to objectivity and a firm belief in the inherent value of scientific knowledge as the basis for action. Putting science into action typically involves hierarchical process of regulation and awareness raising, as typified by extension activities in which knowledge is transferred from experts to passive recipients.

Social learning by contrast suggests that meaningful knowledge is created through the interaction of multiple stakeholders, each with their own perspective, working together to construct issues and solutions. The notion of a single objective reality is replaced with the idea that the world is constructed and reconstructed through interaction between people, and between people and their environment.

Practitioners of social learning argue that through this active process of constructing knowledge, interdependent stakeholders are more likely to become involved in concerted action to affect change, and that this is a preferable mode of action to the hierarchical operations that are a feature of conventional approaches.

Everyone involved in a resource management issue is influenced by a particular “tradition” that shapes the way we see the world. Social learning attempts to uncover the beliefs, assumptions and biases we bring to an issue and to acknowledge their influence. In an institutional setting, whether government, corporate, scientific or community, traditions can act powerfully to privilege certain approaches while constraining others. Institutional cultures can thus not only stifle creativity but without the capacity to reflect on their traditions, they remain blind to their impacts and unable to question their own actions.

The reflective stance of social learning encourages all stakeholders to examine their own traditions and to ask the sort of questions that reveal understanding: who defines the problem and whose knowledge counts? Reflection can also be regarded as an important aspect of responsibility, which replaces objectivity as a central ethic.

SLIM operated in catchments in several European countries where linear transfer of knowledge approaches had proven ineffective in eliciting change. Researchers in the Marche region of Italy sought to address nitrate pollution through a process of active engagement with the community, leading everyone on a steep yet empowering learning curve which saw the researchers’ role change from that of expert, to that of facilitator.
cooperation were never discussed in a group setting and were not being addressed by any of the agencies or organizations operating in the district. While perhaps a little confronted by the thought of actively engaging with communication issues, Marie was well aware of their importance: summing up her frustrations in dealing with agencies and organizations by telling me that ‘no one really listens’. It seems there’s an important point here. While many people might recognize the importance of communication, working to improve upon it is difficult and often ineffective, rendering the option of more tangible tasks a safer and less confronting alternative.

Graeme repeated his sense that the workshop outcome was something of a surprise but felt that the commitment and workload required to realize a more technical project could be very substantial and was an impediment to change. He also felt that the group had been keen to accommodate my interests and that this had influenced

---

61 Allan and Curtis (2005) describe a culture within NRM organizations that prefers activity and comfort over less tangible activities such as learning and reflection. See chapter five for further discussion.
the workshop proceedings. The suggestion seemed to be that the group was thankful for my interest and my willingness to learn from them and that the workshop outcome was something of a compromise in my interest. Juliette made a similar observation, suggesting that the workshops had been good for me and that the group was happy to help. To what extent, I wonder, were the discussions we had together an artifact of my presence and interests? Part of the context of any conversation includes the interests and personalities of those conversing, along with the history of their relationships. And an important premise of this thesis is that the context in which research is conducted, the scholarly traditions followed, the assumptions and commitments made and the type of relationship the researcher chooses to develop with his or her co-researchers (or subjects), must not only be made clear but must be considered as legitimate a topic of inquiry as the research topic itself. I failed to follow up on these comments and can only speculate as to whether they thought my interests shaped the whole tenor of our discussions that day or perhaps only some of the specifics. I don’t believe that we talked so much about the community and communication because they are my interests but must confess to a slight sense of unease at the possibility. I am also grateful and a little humbled that the group should be concerned with helping me.

Responsibility for enacting any of the ideas discussed at the workshop fell largely on Trish who was in any case keen to pursue several ideas through her role as editor of the *Gairdner Gazette*. Marie had expressed a concern that Trish would be left in this position with little support from others. Given the difficulties many participants had identified in finding people to take on roles serving the community in one form or another, this outcome is hardly surprising. In my last conversation with Tony for example, he complained of the poor turnout at the football club for a preseason busy bee. There were plenty of people for training he told me, but only one other bloke apart from himself and his son came along to get the grounds ready.

Trish seemed unperturbed and spoke enthusiastically of her plans to develop a work sheet for city schools on ‘farming life’ and a web-based discussion site for women to

---

62 For a discussion of the importance of sport in regional communities in Australia and its role in building social capital see Tonts (2005); Atherley (2006) and Tonts and Atherley (2005).
share and connect, with a view to encouraging communication between rural and city-based women. Discussing these ideas with Trish on my last visit to the area it seemed that little in the way of concrete outcomes would come from our time together but that Trish would continue to pursue ideas that were of interest to her. Marie expressed an interest in helping with some of these ideas but seemed pessimistic about the level of broader community support.

More importantly my last trip to the Gairdner district gave me the opportunity to thank my co-researchers for their time and effort. Fortuitously this visit coincided with a busy bee at the Gairdner hall and sports ground. Scraping flaky paint and burning leaves seemed a fitting gesture of appreciation on my part and seems a more practical contribution than our many conversations or this thesis. I have no clear idea of the value my co-researchers may have gained from our work together but trust that at the very least I provided an opportunity for people to express their thoughts free from judgment or concern with pre-determined goals, and to listen to others.

**On reflection**

The wealth of issues and concerns raised by my co-researchers provide some confirmation for the decision to put my own interests to one side, trusting that together we might uncover issues to act on that were meaningful for their community. Creating the ‘space’ in which people could freely express their thoughts and feelings, while outwardly a straightforward task, requires a willingness to let go of preconceptions about what constitutes ‘good’ or ‘proper’ research and which issues are important or relevant in any situation. It is a challenge to the interpersonal and communication skills for all participants, not only for the principal researcher, and requires all those involved to invest a degree of trust in each other. I hope that I have in some way repaid the trust placed in me but am clearly in no position to make that judgment.

Farmers’ involvement in resource management issues takes place within tightly managed and structured settings dominated by distant decision makers and the demands of bureaucracy on one hand, and the logic of lopsided economic
arrangements on the other. The opportunities for farmers to talk freely about such issues are rarely if ever provided within the more formal structures provided in the name of stakeholder consultation. Providing this opportunity may be my most valuable contribution.

While the openness and responsiveness of my project design was very worthwhile, at least from my point of view, it created some degree of confusion on the part of my co-researchers as a result of the design-on-the-run approach. This approach was not the result of a paucity of methodological precedents but rather the difficulty of finding simple tools that seemed both manageable and intellectually sophisticated. My inclination toward openness and flying by the seat of my pants made it particularly important that I kept all participants informed of my thoughts and ideas throughout the project. Undoubtedly I could have done better in this regard. Communication was complicated by the gaps between field trips which meant that months would pass without any meaningful contact. I was often a little reluctant to telephone people and found these conversations somewhat difficult. Email I found to be a very poor medium for conversation.

The apparent simplicity of enabling and engaging in conversation was a far more difficult task than I might have imagined. I became, or at least felt, responsible for a series of personal relationships instigated at my request, ostensibly in my interest. Guiding me through these relationships were my sense of ethically appropriate behaviour and my more volatile emotioning. Initiating conversation was often a considerable emotional challenge for me. On field trips I would struggle with a feeling of real discomfort at the thought of turning up at someone’s house having to achieve some step, however trivial, in the ‘progress’ of my project. I was happiest simply talking, over a cup of tea, about whatever grabbed our attention at the time: fishing; crop rotations; the price of lambs; sport; the trouble with shearers or the identification of the bird that flew into the window. Unfortunately such idle chatter had to make way at some point to talk about a particular issue or task or to sign a piece of paper. I should point out that my discomfort almost always disappeared once we got going. And on many occasions I spent a very enjoyable couple of hours with hosts who treated me with considerable warmth and affection.
In addition to better or clearer planning and communication my project would have benefited from closer involvement of partners or mentors both in the field and at the desk. Having a fieldwork partner may have helped alleviate some of my anxieties while providing opportunities to debrief and reflect on our interactions. Given that much of my interest revolved around the intangible aspects of conversation and engagement that are poorly captured by transcripts and notes, it would have been especially valuable to have a disinterested observer to draw on. Despite, or perhaps because of these concerns and difficulties, the conduct of this project was ultimately a rich learning experience and vindication of the trust I placed in my co-researchers.
Chapter 5: Divergent perspectives and institutional relationships

As mentioned previously, the conversations I have been involved in over the course of this project have thrown up a wealth of topics that have remained more or less unexamined. The rather modest aim of this chapter is to outline a few of these that touch upon themes that have been discussed already. My interest here is with certain relational aspects of the life of my co-researchers: namely with learning and knowing, and interactions with various institutions and organizations. One approach I have taken here is widespread in the action research literature: the exploitation and examination of divergent perspectives. Shotter (1993) for example makes a case for the use of multiple ‘dilemmatic themes’ around which conversation and argument can take place. In chapter four I refer to the use Bawden (1991) makes of the dialectical tensions between the concrete and abstract; action and reflection; integration and separation. In a slightly different vein Dick (1993) describes the dialectical technique of convergent interviewing in which paired interviews are used to test agreements by seeking out disagreement. He makes further use of dialectics as a form of triangulation: testing interpretations through the use of multiple sources of information in order to improve their accuracy. While Bawden and Shotter are less concerned with notions of accuracy or truth, the use of dialectics made by these and other authors seems consistent with Bateson’s view of diversity and difference as an opportunity. In other words, the greater potential for learning and the development of new questions, if not for the production of truthful descriptions, lies with those issues and situations that appear to generate tension and disagreement and which encourage emergence.

---

63 My interviews were conducted over three separate field trips, leaving me with enough time between trips to reflect on the open-ended nature of the interviews and to consider more directed approaches such as Dick’s technique of convergent interviewing. However I found myself unwilling, as recommended, to discard the idiosyncratic, for this was what helped to make each interview and each relationship different. These points of difference not only provided depth and variety to the emerging narratives but helped to make the process more interesting for me. Elements of difference and surprise also work to remind the researcher not to fall into stereotyping or jump to premature conclusions (it seems interesting that these intellectual hazards are easily rendered in physical metaphors that imply another kind of risk).
The discussion of structural and policy relations below is highly selective. While presenting what could be seen as somewhat simplistic narratives, my intent is to draw attention to how my co-researchers experience farming life. For them, structural and other external forces that generate significant financial and other stresses are a large part of being a farmer. I am aware though that in stressing the role of structural and external influences there is the danger of overlooking the potential for individual and collective agency (Potter & Tilzey, 2005) and in presenting an overly simplistic account of rural change. A central premise of this project is that concerned actors have the capacity to make meaningful changes to their lives. That said it is abundantly clear that for my co-researchers the consequences of being enmeshed in various networks in which their influence is often marginal, are considerable.

**Neoliberalism as a political rationality**

Before looking at some of the particular ways in which my co-researchers experience their world I want to make some brief comments that might provide some context to what follows. The election of the Hawke – Keating governments in the 1980s and 1990s saw the dramatic rise in new forms of governance informed by a neoliberal political rationality. Drawing on Foucault's (1991) work on governmentality, political rationality is concerned with, among other things, the distribution of tasks between various forms of authority; notions of the appropriate objects and limits of politics; and the distinctive language used to conceptualize the exercise of power and the elaboration of programs (Beeson & Firth, 1998; Rose & Miller, 1992). Particular attention is also drawn to the ‘technologies’ of government, to the use of data, theories, accounting systems and expertise that ‘represent strategies for stabilizing the objectives of authorities’ (Higgins, 2001, p. 315).

In a neoliberal economic rationality the economy is no longer conceived as essentially national but rather transnational and forever engaged in ‘relentless international competition’ (Beeson & Firth, 1998, p. 221). The primacy of efficiency, competition

---

64 Lockie outlines an analysis of the ‘landcare movement’ in Australia from a perspective developed within the sociology of scientific knowledge that rejects the dualisms of agency and structure, nature and society, and micro and macro levels of analysis. Instead he suggests ‘the obvious conceptual move ... is to embrace a more differentiated and contingent understanding of movements’ (Lockie, 2004, p. 42)
and economic security requires that virtually all aspects of society, including welfare, health and education are reshaped in the image of the market and expected to contribute to economic growth. The role of the state then becomes to provide the conditions in which trade and economic activity can flourish. Lockie (1999b, p. 600) argues that this represents a reorganization of the role of the state rather than a withdrawal, and that the language of ‘“deregulation”’ and the ‘“shrinking state”’ is somewhat misleading. Central to the distinctive neoliberal idiom is a focus on the individual as a citizen entrepreneur. In the sphere of agriculture this has translated into policies of self-reliance that regard interventions designed to improve the managerial capacities of farmers as a legitimate area of governance. ‘Self-reliance’, Higgins (2002, p. 177) writes, ‘constitutes farmers as utility maximising individuals’ who are able to manage their farms ‘in a planned, productive and rational manner’ given the proper training and skills. Policies of self-reliance defined what was regarded as ‘rational’ and shaped farmers’ agency as viable or unviable producers.

This insistence on personal capacity as the prime determinant of farm viability denies the contribution of structural elements in economic inequality (Gray & Lawrence, 2001b). Farm failure is thus constructed as a wholly personal failure, leading to self-blame and associated negative psychological states. Vanclay (2003, p.90) though could not be clearer on this point, stating that ‘Farmers who are currently being structured out of agriculture were not marginal because of their inability to farm, but because their farms were structured to be marginal to begin with’.

Not surprisingly the Australian public service was also reorganized in line with market principles in what Yeatman (1990) describes as a ‘cultural revolution’. Among the changes wrought came an emphasis on outcomes and performance indicators, and the subjection of professional judgement to management. These reforms concentrated power in a bureaucratic elite whose ‘managerial capacity and technical expertise’ could be applied to any area of governance regardless of the values or issues that might be apply (Beeson & Firth, 1998, p. 227).

---

65 Alston (2012) argues that farm failure may also result in a loss of identity for an individual farmer.
Neoliberal ideas continue to influence the governance of environmental management. Higgins, Dibden and Cocklin (2012) examine the role of market instruments (MIs), which include measures such as payment for the provision of ecosystem services, as a feature of what they term the ‘“neoliberalisation of nature”’. Such instruments have the benefits, from a government perspective, of being consistent with existing neoliberal approaches to management while remaining in accord with the World Trade Organization’s (WTO) agenda for trade liberalisation. While accepting that MIs tend to increase the influence of market relations into public domains, Higgins et al. argue that the neoliberalisation of nature is far from straightforward and can be regarded as essentially ‘complex, contested and contingent’ (ibid., p. 378). Pointing out the hybrid nature of many neoliberal forms of governance, Higgins et al. suggest that MIs may not only incorporate environmental and social justice objectives, but may also create new opportunities for resistance and ‘open up progressive political possibilities’ (ibid., p. 377). Dempsey and Robertson (2012) argue that there is considerable heterogeneity within the discourse around neoliberal policy ideas such as payments for ecosystem services (ES). Aiming to encourage wider engagement and concerned about the effects of ‘market-led’ policies on local and indigenous communities, they suggest that opportunities for engagement can be found within the ‘polyvocal’ ES literature. They identify five areas of disagreement which include whether to define ES as a useful metaphor or as a commodity; the use of ecological information in economic models; and ‘tensions over the place and role of ES policy in relation to equity, development and markets’ (ibid., p. 760). And Coleman and Skogstad (1995, p. 243) point out that the connection ‘between policy ideas, such as neoliberalism, and actual policy outcomes is by no means direct’.

**Independence and powerlessness**

An interesting dialectic emerged around the issue of independence and powerlessness as features of farming life. In the following interview extract Graeme explained the importance of being able to make his own decisions and to bear the consequences:

> Ohh, I guess in many respects it's an environment where … the outcomes are based to a large degree on your own decisions, and nature. The decisions that you
make are your own, they’re, and the consequences of the decisions you make are your own. You’re not reliant on other, well, you make your decisions based on information from other people or theory or whatever; the rewards for what you do are your own, any stuff-ups don’t impact on anyone else, they only impact on you. So it’s sort of, that ability to be a decision maker and to benefit or suffer the consequences of your own decision making. And the fact it’s continually, it’s continuously mobile, a continuously evolving environment, it’s not a monotonous, tedious, repetitive day in day out. And if you do get sick of something you can go and do something else completely different at your own will, not of somebody else's design or direction.

Trish and Juliette made similar observations on the values of independence and personal responsibility:

I think I quite like the solitude of farming, not having to have a, you don’t have to have a huge crowd of people to be always doing something, you can monitor you own pace of life a bit more.

... I guess you’re your own boss – I mean what you do each day or what you do is up to you ... you’re in charge of all your decisions, so whatever decision you make, whether it works or not, you’re ultimately responsible. I mean, some you get right and some you don’t, but as long as you learn from your mistakes, you progress.

From my conversations with Stuart prior to our interview it was clear that he enjoyed working on his own. When asked what the attraction was he replied,

Umm, job satisfaction to a large extent I guess. Yeah, anything that’s done generally you know you’ve achieved it yourself. And I’m not a social person so I don’t crave to be in the company of other people, work or socially generally either I guess.

At another point in the interview the conversation turns to some of his previous work experiences as a mechanic and as a shearer, and he again expressed a preference for the satisfaction of solitary work:

No, I guess and the mechanic job was a bit the same, I felt that everything you did was taken away, and wrecked and changed or regrown or whatever it was, and I remember particularly we were working on a friend’s house, and doing bits to it and walking away and the wall was still there or whatever it was, and I could have gone
back 10 years later and seen something for your effort I guess. Whereas the mechanical thing was, the good work was all done out of sight, internally on motors and people would shut the bonnet and drive it away and wreck it again, and you’d shear the sheep and throw them out the hole and they’d go back and grow some more wool.

Part of the attraction of this independence seems to be the responsibility that comes with it, the idea that both the decisions and their consequences are your own: as Gareth puts it, ‘We can get all the advice that’s out there then you have to make up your own mind how to apply it’. There appears to be a strong sense of pride being expressed in these comments that is associated with the ability to make your own decisions.

At the same time, many of the interviews touched on aspects of farming life over which people felt they had little or no control. Reliance on the weather is a fairly obvious example: for Tony the situation is that ‘We seem to teeter on the edge of the next rain all the time’. Our ability to influence rainfall seems limited at best. Theoretically at least, some of the structural and institutional settings farmers find themselves a part of, are subject to change through social and political processes. For the farmers I worked with however, there seems little prospect of any such changes to their benefit. These apparently contradictory features of farming life, powerlessness and control, were summed up well by Trish:

What other things are good about it? I think, hmmm. I think possibly you have, well you don’t actually, in a way you have control over your lifestyle but, from a financial point of view you have less control, if that makes sense. I don’t know.

When asked to explain she replied:

Well because you don’t have a lot of control over the financial returns on your investment really, you can’t set your price even though it costs you X amount of money to put in a crop, you don’t have any control over what that’s actually sold for, the prices are set long before

…
And so, and all of the variables, like you spend all that money to put the crop in, but you don’t have any control over the weather or the locusts, so there’s so many variables that affect your business, and it’s not like you can really plan, you have a farm management plan and you factor in good years and bad years, but abh, there’s just the sense that you’re at the mercy of big organizations and corporations and the weather, and all sorts of things that you have no control over, that’s my perception.

The difficulty of being price takers rather than price setters, and the volatility of these prices, was talked about in several interviews. Juliette told me that:

*It’s more about prices, yeah, well we have lost control of our produce and our farm gate because we don’t control our markets. So we’re at the whim of our markets — we produce good but we don’t market well.*

And Tony described some of the impact of the collapse of the wool market:

*... you know, we have got the farm paid off and the folks paid off, and then you think well, you know we should be able to, if we do it this way we’ll clear that in the next 5 or 6 years, and then the wool market goes on its tits and you suddenly think ‘Christ, shouldn’t have done that’.*

This sense of powerlessness is not solely a feature of the relationship to market forces but is also a feature of relationships with nature and with various government agencies. While the emotional responses to this sense of powerlessness were not discussed in all interviews, expressions of frustration and anger were clearly expressed in several conversations and in particular with Marie (see Figure 5.1 for the model created from this interview):

*When the seasons are OK it feels great, when they’re not you feel like you’re having the, you’re copping the first impact of all the bad decisions that have happened, all the powerlessness stuff is you know. I don’t know, you feel like you’re actually, I’m not explaining this well at all, I’m not sure what I’m feeling. Feel like we’re the first cab off the rank when things are going pear shaped, whether it’s the climate or markets or the biodiversity stuff, feel like we’re gonna have that impact first compared to living anywhere else. We’ve got fragile soil, it’s not very forgiving, you can only stuff it up a couple times before it’s stuffed for good. Probably started stuffed*
but it’s the definition of stuffed is the problem you know, grow Grevilleas on it it’s not stuffed.

At another point in our conversation Marie expressed her frustration with what she regards as a lack of options for alternative farming practices and a sense that conventional practices are causing harm to the natural ‘system’:

*And also in the cropping program, the lack of viable options you can take, that don’t affect you economically, to do it differently. It’s like you’re just stuck spraying chemical on the canola for mites when you know you’ve buggered up the system because there’s an overpopulation of something and therefore affected something else that was probably a predator of something else, so it’s kind of like, I’m really - that’s my sort of issues with soil health, we’re part of a system that’s not improving it as much as we, personally intend to. The powerlessness is part of it, it’s too, ahh not comfortable with it at all. Unless you actually can quarantine yourself from the rest of the world which you physically can’t …*

Very early in the interview Marie mentioned that she had been thinking about her concerns prior to my arrival and that a sense of powerlessness was uppermost. An important contribution to this sense was her recent experience with an aerial locust spraying program:

*And some of the foremost things that happened for me in the last 6 months is the locust spraying, the chemical impact of all of that, the unknown ramifications of it, and we could have said no but it didn’t really matter if you said no because your neighbour would say yes and we physically only had half the farm sprayed …*

RC: Mmm.

Marie: … and the other half don’t have any yabbies in them, in the dams left, so, all yabbies, all marron, all other fish we might have had in there have all disappeared …

RC: Yeah.

Marie: … although from the department of ag’s point of view they only sprayed half the farm and not those dams. So we know straight away there’s impact that they won’t record or acknowledge. Apart from the procedural stuff where they promised a
phone call to say the day they were going to spray and that never happened, so I had
the kids at the school bus.

RC: Yep.

Marie: I had Stuart out in the paddock. We both sort of said those young lambs we
don’t know how low that plane’ll go so perhaps we might get them in the yards so we
don’t have stock through the fence. Because the argument was they’d spray so low
there’s no drift, don’t worry about drift because we spray so low. Well Stuart’s
actually out in the paddock when he’s spraying and number one I have a major
problem with that. No stock moved at all because they were so high. Stock didn’t
take any notice of the aerial spraying, and that’s including two horses not used to
aeroplanes, so I’m thinking this sucks, it really does.

This impassioned recounting of the spraying episode was made with no prompting
from me; this was clearly an experience that had triggered (and continued to trigger) a
strong emotional response and its recollection may have shaped the tone of the rest
of our conversation.

Our conversation around the spraying episode revealed further frustration from a
sense that while the spraying seemed justified and that refusing to be sprayed would
have jeopardized the overall success of the program, Marie felt that not enough was
known about both the impacts of the spraying and any alternative approaches. Issues
arising from dealing with agencies and organizations, and broader questions around
knowing, knowledge and ignorance will be discussed below.

Much of my conversation with Marie is consistent with what Kate Wetherell (2012)
describes as affective practice. I can recall quite clearly the intensity of her affective
performance and the complex of emotions and experience that she played out. This
was not, as Wetherell suggests, a simple matter of anger or frustration, of basic
emotions, but a contextual, embodied enactment of her relationship with farming life
and with organizations and broader structural arrangements in particular. Her identity
as a farmer, as someone with little influence on the decision making processes that
shape aspects of her life, is powerfully played out in this affective practice. It suggests
that in addition to the relatively well established discussion around power inequities
and other constraints on farmers, there are also affective practices that are no less important but which are less frequently acknowledged.

**Knowing and learning, ignorance and uncertainty**

A contributing factor in Marie’s sense of powerlessness is self-confessed ignorance. When asked if she knew of a preferable alternative to the conventional spraying for locust control she replied:

> Umm, I don’t know if there’s a solution, but I mean. You know, you can put milk on your aphids on your roses for aphid control rather than spraying them, it would be nice to know if there’s … organic options. Not that we know if there’s much impact there either. I’m always flummoxed at how little we know about nature to assume we can go and impose stuff on it; we just don’t know anything about the ramifications of it.

Interestingly Marie acknowledged that she has the capacity to do something about her lack of knowledge but accepts that what happens in the paddock is Stuart’s decision: ‘It’s pretty much Stuart’s decision what we spray. And yeah, so if I was serious about the powerlessness I should up my knowledge and go with the, follow the process a bit more than I do’. To what extent then can ignorance and uncertainty be addressed by learning and knowing, and what counts as valid knowledge? A degree of uncertainty seems inevitable in farming and in environmental management more broadly. The nature of learning has been a central theme in this project and my approach has been influenced by the argument that knowing and learning are more personal and complex processes than is suggested by the transfer of technology approach to agricultural extension. It is clear from this project that the farmers involved have been prepared to change their farming practices to better care for the land. As an example many farmers in the district have responded to the experience of severe dust storms by adopting no-till technologies and feedlots during periods where pastures are weak. The point I’m trying to make is that my co-researchers are not averse to change and are eager to learn better ways of farming, but the process of learning is far from straightforward. One confounding aspect is a widely held skepticism and disregard for
Figure 5.1: Model created from the interview with Marie
the advice provided by government agencies and agribusinesses. Stuart recalled some of his early experiences with soil tests:

So I tried to do things a bit differently and when I started with my first block and did some soil tests and sent them to one of the big fertilizer companies. And the results came back with varying levels of whatever there was, but the recommendation was the same for every site, and it was high amounts of their particular product. I didn’t, it looked like it was just business to me, it didn’t matter what the soil tests said just put on whatever you like.

Trish expressed a similar sentiment in the following exchange which was prompted by my question about what prevented her and Graeme from achieving their vision:

… we’re still learning but because there’s so many biases, the chemical companies have no interest in exploring other options because it will decrease their market share umm, that’s a bit limiting. Maybe, yes, I think a lot do to with the big organizations not really moving down, not exploring alternative things, that’s an issue. What else?

RC: So where do you find that sort of learning, how does that sort of learning take place if the, you’re suggesting the larger entities aren’t interested?

Trish: I think like I said a lot of the agronomists, the local agronomists, you think that they, it must be coming through the education system as they’re coming out, obviously new ideas and so forth, but then they get into the real world and get employed by Landmark or Elders as agronomists and then they’re commissioned to sell those products through big business, so they’re a little bit restrained in terms of what they can tell people because their wages are being paid by them. So while the knowledge is there, the incentives perhaps for them to be sharing that alternative knowledge is not really getting out that much.

Tony was clearly frustrated and angered at some of the actions of the state Department of Agriculture at the time when local farmers were keen to adopt no-till seeding practices in order to reduce soil loss through dust storms:

… they conned us something terribly the Department, by telling us, we wanted on farm research, we want farm paddock research, not bloody six foot plots! Especially in the days of trying to get a seeding system which would go through stubbles – they
played around with all these trial plots and, because they did it on our place. And they go for 40 metres, so they’ll do a tine one, then a disk one, and at the end of the runs, you know it might germinate and it might do better, but at the end of the run there’s this heap of straw. And if you went into a paddock you might go another 10 metres and everything would be blocked solid. So that’s not a solution. But the trial would show that they got a good germination with the tines and the press wheels, but if you or I try to do it, you’re not going to get a crop in, you’ll spend all your time underneath the bloody thing pulling the crap out.

With reduced services being offered by state agencies and corporate advice being tied to product sales, farmers looking for independent advice or for information on less conventional farming practices may be forced to hire specialist consultants. An alternative (or complementary) approach may be to make better use of on-farm resources for experimentation, monitoring and evaluation. Such resources include more formalized tools such as soil health cards (Lines-Kelly & Jenkins, 2006) as well as a farmer’s memory, observations and intuitions. It was my belief that farmers could benefit from collective efforts to develop tools for soil monitoring and evaluation that began this project. An interesting aspect of on-farm investigations that arose from our interviews was the attitude to different forms of knowledge and information.

Having farmed in the district for many years Gareth has considerable knowledge of the changes to soils and landscapes in the area:

Because when we cleared this land, with all the root matter that was in the soil from the trees and the bush, it was very soft and friable and then it packed right down to nothing. One observation is you can see rocks appear and people say the rocks are popping up but they’re not, the soil’s setting down around them. So until you can build that soil up again with root matter and organic matter, you’re probably never going to have the same water holding capacity as what it was in bush.

Ross makes use of a variety of strategies and approaches to learning about better ways of farming, including magazines, field days and trials and hiring an independent soil consultant. He also makes considerable efforts to better understand what is happening in his own paddocks through close observations:
... have you got enough root matter in your soil to keep it open to let the water penetrate? Things like that is what I’m always looking for. When it rains does the water actually go into the soil? Or is it running around on top and what’s happening to it? And it’s those little roots, are they draining the moisture in so you can use it? I’m always looking for what’s happening when it rains, what’s happening on the ground.

RC: And how do you go about finding out what’s happening now?

Ross: I get out there with a little shovel and dig around, and just see what root matter’s in the ground, just visual observations of what’s happening.

RC: Are you satisfied that that’s telling you what you want to know?

Ross: Yeah, and I go and look under different crops and just see what the roots are doing under the wheat crop and barley crop and the oats and rye grass and clovers and just see where the roots have gone, dig them up, see how deep the roots have gone in, and wash them off see if they’re healthy. And look at all those that are causing us, why things aren’t working properly.

When asked what he thinks of his observations he said: ‘They’re important but they’re not scientific. So you can go out and say you observed this but unless you can quantify it it’s only in your mind and you can’t really tell everyone else to do it.’ While he seems satisfied that his observations are of value there is the suggestion that ‘scientific’ data are perhaps of a higher value. Tony expresses a similar sentiment while telling me that he would like to see the Fitzgerald Biosphere Group (FBG) conducting long term research on crop rotations. Despite his disappointment with many of their activities he believes that trials conducted by the FBG would have credibility and that they could attract the right people to be involved. While he is convinced of the benefits of longer and more complex rotations he feels that nobody would listen to him. Like Ross, whether anybody else agrees with them matters very little to Tony, but both men seem to assume that for other people it is scientific data and knowledge that is required to be convincing.
Like Ross, Stuart is a keen observer of the condition of the farm and its soils. He is also convinced that his chosen approach to soil management is the right decision but would like the reassurance of quantified trial data to confirm it:

\[\ldots \text{it's the quantifying thing again, I dunno, have we improved the farm at all, have we improved it 2% have we improved it 5%, in production, who knows, perhaps it's gone backwards.}\]

RC: You don’t seem to think that about what you’ve done here though?

Stuart: I don’t feel that way no, but by the same token I don’t have any evidence to prove otherwise.

RC: Are you umm, are you being abh, I’m just, I guess I’m just curious as to what, as to why some evidence carries more weight than others I suppose.

Stuart: Mmm, that is a good point. I guess, I dunno, we all want to believe something, we want to believe in our religion or …

RC: But you don’t seem to put as much weight on your own observations on the property as on what you might see as conventional trial, type of work.

Stuart: No and I don’t yeah, I guess I don’t like to be one to talk about data and the like but, somewhere along the line we have to try and quantify what’s been done. You speak to plenty of farmers that never soil tested before they limed, applied lime and never soil tested afterwards and ‘I reckon it did alright’ or ‘I reckon it did no good’, pretty hopeless.

Despite Stuart’s desire for quantified evidence that his current practices are delivering results, it is belief rather than results that seems to drive his approach to farming. While critical of the narrow focus of field trials comparing rates of NPK (standard soluble fertilizers with varying proportions of nitrogen, phosphorous and potassium) fertilizers with yields, Stuart admits that he would view similar trial designs based on the practices he employs quite differently, because he believes such an approach is ‘heading for a long term sustainable profitable soil’. Stuart is aware of the apparent

66 Geoff’s approach to soil management and agronomy is based on the approach of Neil Kinsey, a US consultant who employs some of the methods developed by the pioneering soil scientist William Albrecht (1989).
hypocrisy of his position: being critical of those farmers who make management
decisions based on flimsy evidence while making many of his own based on ‘belief’.

Many of my co-researchers are motivated by the belief that what they are doing is the
right thing while recognizing that in the public sphere there appears to be a view that
only ‘scientific’ data are acceptable to justify decision making. As Trish put it,

Well I suppose it has to be validated before anyone will believe it, so yes it is, not so
much for me, but for bureaucracy and the way of the world in general, I think things
have to be scientifically validated before they become accepted practice.

These comments suggest that while there is a place for hard data as a decision making
tool, the choice of data and its interpretation is strongly influenced by beliefs. That
these farmers are able to make to their own management decisions and to act in
accordance with their beliefs is an important part of what they value in farming. While
they might like to have hard data that supports their decisions, no amount of data in
itself seems likely to be the overwhelming basis for farm management. Stuart seems
to epitomize this attitude in his decisions to run a small number of cattle and to
protect remnant vegetation. He is concerned that the cattle contribute little to the
farm bottom line and that he is unable to accurately calculate any financial benefit.
Yet he believes there are benefits that flow on to cereal crops following a pasture
phase, and it is livestock rather than cropping that is his passion. Caring for the
natural environment is another passion that defies simple calculations of profit:

I guess the people that encourage us to protect our remnants tell us that that will
benefit our farming system as well. I, the benefits are fairly small I think. Generally
I don’t think it is connected to the farm, it’s another issue, I guess it’s personal, and
it’s feelgood, it’s not profitable it’s cost, it’s expense, on top of.

For my co-researchers, knowing and learning appear to be strongly shaped by beliefs
and emotions, complicated by a degree of ambivalence towards traditional sources of
advice. Hard won experiential learning: recounted here in the dust storms of the early
1980s, in Ross’s observations of soil loss after flooding in South Australia and his
careful study of crop roots in the paddock, seem to be regarded as somehow not
sufficiently scientific, as a form of knowledge less rigorous and reliable than that
produced by the scientific method. And yet there is the acknowledgement that such experiential learning is personally valuable and that the products of science have at times been a disappointment. It’s not clear to me whether my co-researchers understand that the desired technology of quantified results is a product of the same institutional norms that underpin the short-term small scale research plots and the recommendations for fertilizer and pesticide applications of which they are critical.

One of my aims in the earliest stages of the project was to provide farmers with some tools to help them learn about their soils, to answer their questions using processes that they could design and implement. Ross, Stuart, Graeme and Tony all make decisions about how they farm that are informed by their beliefs regarding how the land should be managed and their responsibilities as land managers. The standardized products of agricultural R&D often do not address the contexts in which they work and will continue to be evaluated in the light of their beliefs and goals. However the possibility of finding neat technical solutions remains attractive. When I asked Graeme what stands in the way of him achieving the soil condition he is aiming for he replies ‘accurate … recipes for outcomes’. The recipe metaphor alludes to the idea of reproducible results being achieved by adherence to a formula, irrespective of context. Following this comment he does go on to say that he finds it difficult to judge the authenticity of such recommendations given the commercial interests involved. I would have liked the opportunity to discuss in more detail my co-researchers’ understanding of the ways in which knowledge is produced, the commitments and assumptions that frame its production and that interests that are served. It seems to me though that experience has taught them a lot about these processes already even if there’s little evidence that their experiences are reshaping institutionalized practices.

**Policy and structural constraints and the role of technology**

There is a considerable body of literature that addresses the impacts on Australian farmers of policy and economic settings. Halpin and Guilfoyle (2005, p.476) argue that the trade liberalisation policies of successive Australian governments since the 1970’s, have left Australian farmers ‘somewhat beholden to the vagaries of European
and North American trade policies’. In keeping with a neoliberal political rationality, farmers have become more exposed to international competition and to events and factors well beyond their influence.

The difficulty of being dependent on the operation of markets, over which the farmer has no control, was made clear in the following exchange with Stuart:

RC: How do you … see the future, as a farmer?

Stuart: Umm, I don’t know, I think I’m probably less optimistic than a lot of people and I guess because Australia’s such a small player in agriculture in the world and we operate in a market against fairly highly protected farmers in Europe and the US. So it just seems we’re always going to be a bit behind the 8 ball [colloq. meaning to be at a disadvantage]. And yeah, the times when Australian farmers are particularly profitable is when the US or Europe have low production years, and Australia slips in and gets a decent return.

…

RC: Do you see any way of abb, getting out of that situation …

Stuart: There’s only two ways, it’s either take the protection away from them or give it to Australian farmers.

RC: You see yourself fairly tightly bound up in that broader scale commodity trading?

Stuart: Yeah I think so, particularly Western Australia is export orientated. I guess the argument with get rid of the single desk is there’s different opinions between eastern Australia and Western Australia because eastern Australia has a pretty large domestic market for grains and meat where Western Australia is mostly export, so we’re right into that world market.

RC: Do you see yourself always being a commodity producer then?

Stuart: I hope so.

RC: Why do you say that, you don’t like the alternative?
Stuart: I guess I’m doing basically what I want to do. I guess that goes back to the old argument that farmers are price takers not price makers so, I’m sure people have worked to try and turn that around but it’s not an easy one.

RC: You don’t think there is something that you could be doing as farmers to try and improve that situation?

Stuart: Not that I, no I don’t know of anything in particular, I’m sure lots of things have been tried. I’m very reluctant to stick my head too far out of line because we’ve all seen the fad crops and livestock and things come and go and, yeah, but I don’t think too many have gone the distance.

RC: So how do you, if you’re going to remain bound up in that commodity trading system, how do you improve the profitability of your business?

Stuart: By increasing our productivity, keeping the quality up, yeah that’s about all that I can see that we can do.

RC: Are you confident that increasing productivity will inevitably increase your profits?

Stuart: No. Costs are increasing a lot faster than commodity prices.

Stuart has exercised his independence in making the choice to become a commodity producer while recognizing that the ultimate success of his business is to a certain degree, out of his hands. The economist Stewart Smith (1992) analyses the dramatic weakening of the farming sector within the broader business of agriculture, over the last century. While Smith’s analysis deals specifically with the situation in the United States, I suggest that many of the same influences and processes have operated in Australia and elsewhere. Smith considers farming as one of three components of agriculture: the others being the input sector, which supplies farmers with goods and services, and the marketing sector which includes processors, distributors, retailers and others. Between the years 1910 to 1990 the marketing sector increased its share of the total economic activity generated by agriculture from 44% to 67% while the input sector increased its share from 15% to 24%. Over the same period the farming sector saw its share of economic activity drop from 41% to 9%. Smith’s analysis also reveals that the absolute value of farming has shrunk during this time, from $24.2
billion to $22.6 billion, while the absolute value of the marketing and input sectors have increased 627% and 460% respectively (ibid., p. 3).

For Smith, technology is the ‘linchpin’ in this process of the loss of farming economic activity. ‘Most agricultural research’ he writes, ‘results in more nonfarm activity at the expense of farm activity’ (ibid., p. 5). Technology development and adoption are driven by various factors including the increasing reliance of research institutions on private funding, and the relative strength of the relationships between public and privately funded researchers in comparison to those between farmers and researchers. A range of input subsidies, which include the public absorption of the external costs of technology use, also act to encourage adoption. External costs can be both environmental and social, such as the ‘dislocation costs of deteriorating rural communities’ (ibid., p. 7).

The increase in cropping pressure in much of the Western Australian wheatbelt over the last twenty years or so provides an example of the way in which the rapid adoption of new technologies, combined with changes in market conditions, can alter farming practices and generate external costs. Doole (2008) argues that a combination of relatively high grain prices and low nitrogen fertilizer prices, together with a drop in prices for wool, has led to more intensive cropping and a reduction in pasture phases. Increased cropping and the widespread adoption of reduced tillage technologies has led to a huge increase in the use of herbicides and the subsequent rise of herbicide resistance, most notably in the major weed species rigid rye grass (*Lolium rigidum* Gaudin)67. In addition, Doole argues, the increase in shallow rooted annual crops has exacerbated already extensive problems associated with rising water tables. While Tony and Gareth both regard the development and adoption of reduced tillage technologies as a very positive move, some of the consequences are becoming increasingly problematic.

---

67 The spread of herbicide resistant weeds is a growing problem for agriculture throughout the world, particularly in those places, like Australia, Canada and the US, where industrial farming techniques rely heavily on herbicides such as Glyphosate. Agri-business interests are concerned that herbicides will lose their effectiveness, prompting the announcement in Perth on February 2013 at the Global Herbicide Resistance Challenge (GHRC) conference of Weedsmart, an industry-led initiative to promote the long term sustainability of herbicide use [www.weedsmart.org.au].
Lockie (1999b) though points out the problematic nature of over emphasizing the role of global capital and nation-states in shaping on-farm practices and profitability. Little consideration is given, he argues, to the ‘vast resources’ employed, often ineffectually, by states and businesses to maintain their hegemony. At the same, some of the tools employed in the name of neoliberal agricultural policies provide opportunities for farmers to make use of new relations to capital to stabilize their incomes and retain control of their operations.

Tony’s apparent fascination with the potential of new technologies provides some indication of how influential technologies developed off-farm have become. At different times he expresses an interest in a genetically modified sheep that requires no drenching and a genetically modified canola that has the massive root system of wild radish, a related and problematic weed species. Part of the attraction of new technologies, across a range of industries, is their almost magical potential. Genetic modification offers the possibility of plants and animals with properties that could scarcely have been imagined only ten to twenty years ago. Irrespective of whether their potential is realized, Tony’s comments hint at the idea that desirable outcomes, in this case sheep that require no drenching and canola with better root systems, can only be achieved with the introduction of new technologies that bolster non-farm activity, and not through better use of already available resources.

My characterization of Tony’s outlook may be unfair. On several occasions he has outlined his interest in developing more complex and longer crop rotations to counter the development of diseases and herbicide resistance, while improving soil condition. Improved rotations are an old and proven technology and one that requires relatively little off-farm investment. However the settings within which broadacre farming takes place in Australia present several difficulties with Tony’s plan. The first involves the problem of being able to sell a greater variety of crop products when existing marketing arrangements are geared around a small number of high volume commodities. Secondly there is comparatively little research being conducted in Australia on the effects of long term rotations on soil health and productivity, leaving

---

68 During our interview Rick mentions that he has a market for 7 tonnes of a variety of birdseed at $1000 a tonne, noting that if one farmer put in 40 hectares of it ‘then the market’s fucked’.
Tony to conduct his own research. Tony would like to see the FBG conducting this type of research but bemoans what he sees as the dominance of research projects designed to attract funding and demonstrate short-term success (see Tony’s comments on the priorities of research organizations in chapter 4).

Over the last century agricultural policy in the developed world has flowed from a productionist paradigm with the broad aim of providing cheap and abundant food supplies for wage labour. Farmers have been encouraged to maximize yield through the use of technological innovations, such as fertilizers, pesticides and machinery, actively supported by state research and extension agencies (Goodman & Redclift, 1991). In Australia, as elsewhere, the state has more recently moved to reduce, or perhaps more accurately to re-configure its involvement in agriculture and a broad consensus has emerged to support greater deregulation and the adoption of neoliberal policies (Cocklin, Dibden, & Mautner, 2006; Coleman & Skogstad, 1995; Gray & Lawrence, 2001a; Taylor & Lawrence, 2012).

The broad consensus in Australia regarding agricultural policy and possible futures is striking when compared to the debates around rural politics and governance in Europe and elsewhere. Coleman and Skogstad (1995) argue that the more ready adoption of neoliberal policies in Australia, compared to Canada, can be explained in part by the presence in Australia of a network of competent and authoritative professionals, what Haas (cited in ibid., p.250) calls an ‘epistemic community’, and influential sponsors in the form of the National Farmers’ Federation (NFF). In the 1980s conditions were ‘propitious’ for the development of a broad and cohesive epistemic community whose influence extended throughout government and the NFF and helped facilitate a consensus position around a neoliberalist strategy. While in Canada, a more pluralist policy making environment helped to retain some of the protection historically afforded farmers in that country (Coleman & Skogstad, 1995).

---

69 Middendorf and Busch (1997) describe the simultaneous development of specialization by farmers and agricultural researchers beginning early in the twentieth century, in the same sort of process described by Shackley, Wynne and Warterton (1996). Specialization leads to ‘successful’ results for both farmers and researchers while bolstering their commitment to it as a way of managing their particular professions. Specialization though inhibits communication and cooperation between and within farmers, researchers and the wider public, discourages inquiry into new approaches and leads to a ‘shucking off’ of responsibility.

70 See also Knorr Cetina (1999), Epistemic cultures: how the sciences make knowledge.
Botterill (2005, p. 216) makes the same argument regarding the consensus between the NFF and rural policy makers in federal government departments, suggesting that ‘the agricultural policy community in Australia is virtually closed to those who disagree with the prevailing economic approach’. In Europe, in the simplest terms, the argument has been between growing support for a neoliberal agenda, in which an important role is seen for organizations such as World Trade Organization (WTO), and those arguing for a ‘multifunctional’ agriculture that recognizes social, cultural and ecological values in rural landscapes. Echoing aspects of Smith’s analysis above, Potter and Tilzey (2005) suggest that support for neoliberal policies has been strengthened by the growing influence of non-farming sectors in the agricultural industry such as processors and retailers. This is a contest, Potter and Tilzey argue, that is at once discursive and ideological and one in which myths and symbols are employed to bolster alternative narratives. It reveals not only differences in policy goals and the instruments for their attainment, but also fundamental differences in the nature of the ‘problem’ being addressed.

**Future directions for Australian farming**

A couple of recent Australian publications appear to reinforce the view that the future for Australian farmers lies in increasing productivity and developing greater market access overseas. For Keating and Carberry (2010), overcoming the emerging productivity plateau is a crucial task if Australian farmers are to exploit new opportunities. One of the ways to achieve this they suggest, is to encourage good growers to adopt the practices of those growers operating further up the efficiency curve. These growers accept higher risk through higher investment with expectations of higher yields and returns. Essentially, this route is for those growers who currently choose to accept lower returns from lower investments and who need to be convinced that the increased investment needed to achieve the returns of the best growers justifies their higher risk exposure (emphasis added) (ibid., p.275)

There seems to be an unquestioned assumption here that the main task for all farmers is to increase productivity through accepting higher risks, in part to meet the growing global demand for food (the risks, it should be noted, are taken overwhelmingly by
farmers and not by the non-farming sector). Where is the acknowledgment that some farmers may be motivated by aims other than maximising returns or that best growers, that is the best farmers, may not be those who grow the biggest crops?

Stuart for example believes that,

\[
\text{a lot of the more profitable farmers, whether it’s by choice or what I don’t know, have little regard for the environment … and tackle the whole farming as a business, and yeah profitability and have little regard for the environment I guess. And I can respect that too but it’s not the way that I want to do it.}
\]

And for Graeme,

\[
\text{the financial outcomes are secondary, my primary focus is … to do the best I can with the land I’ve got available to me, without causing a deterioration in it, and hopefully improving it. And if I get financial reward over and above then that’s an added bonus, it’s not the incentive though.}
\]

\[
\text{…}
\]

\[
\text{I’d rather go broke doing the right thing than make a heap of money doing the wrong thing, is the way I see it.}
\]

Given that the pursuit of increasing productivity through the adoption of new technologies has played a key role in the decline of farmer numbers, the increased wealth of non-farming actors within agricultural industries and in myriad forms of environmental degradation, there are good reasons why farmers would question this option. In addition there are rising input costs, volatile commodity prices, a strong Australian dollar and the predicted disproportionate impact of climate change (Alston, 2012) for farmers to consider.

The recently released Initial findings report of the NFF’s Blueprint for Australian agriculture contains a number of ‘additional critical issues’ raised by the Blueprint Advisory Group. These include increased investment in R&D and the further development of ‘the extension/technology transfer function’, together with the expansion of trade, especially in Asia, and a reduction in trade barriers to Australian exports (NFF, 2012, p. 10). The advisory group also argues for greater cohesion within the industry,
suggesting that the ‘strength of national and sectoral representation is the unified voice and position on the public policy landscape’ (ibid., p. 11). The notion of a unified voice within the industry conveniently ignores the point Smith and others make clear above: that there are increasingly winners and losers within the broader agricultural industry, and that farmers (particularly family farmers) are more likely to be found in the latter class. At the risk of over simplifying the situation there appears to remain strong support within the policy settings for farmers to meet current and future challenges with more of the same: more technology transfer, more productivity and more trade.

The ‘good farmer’

The values of productivism, which remain influential in Australian agriculture, also appear to be maintained and reproduced through the identity of the ‘good farmer’ as the grower of big crops. While questions of identity did not emerge as a major theme in my research, a couple of comments from my co-researchers suggested that this is a potentially productive and interesting line of inquiry. During a visit to the SwarbTony’s the question of what makes a good farmer was briefly discussed over lunch. I have no record of the details of the conversation but Tony and his son seemed to agree that the size of your crop was the most important marker. Rob Burton (2004, p. 197), working with farmers in southern England, argues that ‘the practice of increasing production has become incorporated with the very ethos of being a “good farmer”’. Identity matters Burton suggests, because identifying with a particular social group ‘provides both a sense of security and a stable framework with which to understand the world through offering shared meanings, interpretations and understanding of events and objects’ (ibid., p. 198). Farmers operate within a highly symbolic environment he argues, in which social status is maintained or challenged through scrutiny of very public behaviours such as growing crops. To be considered a good farmer, the symbolism of utilitarian behaviour that leads to high-yielding crops is particularly important. So important that Burton suggests yield and tidiness are more important markers of a good farmer than profit. The costs of not belonging can also be high with the abandonment of acceptable (and symbolic) practices potentially leading to ostracism. I am familiar with an ex-farmer in the WA wheatbelt who
suffered considerable social pressures from his community when he converted to ‘organic’ farming. One of his former school mates who worked as an agri-business representative refused to speak to him.

In the Gairdner district one apparent set of social groups is marked out by demographics: namely the older first generation of farmers such as Tony and Ross, and those of the second generation. Marie described a pattern of behaviour among many second generation farmers that Burton might find of interest:

So there are all patterns, ways of taking up technology or different things. There’s not many of Stuart and my demographic for example that are not using liquid nitrogen, it’s something that’s gone whoosh through that group of blokes. And we’re in that group but it didn’t go whoosh for us. I don’t know that’s just an observation thing.

While in a similar age group to most of the second generation farmers, the fact that neither Stuart nor Marie grew up in the area and that they tended to socialize with those of Tony and Ross’s generation, marked them out Marie felt, as not quite belonging. That they had no interest in adopting what could be seen as the symbolic utilitarian behaviour of using liquid nitrogen (a saturated solution of urea), suggests they may be seen as not conforming to the standards of the good farmer. Stuart’s ready admission that he sees caring for remnant vegetation as of equal importance to growing crops seems to confirm this.

Burton notes that competitiveness is also associated with the notion of the good farmer. He describes the same sort of boastful behaviour regarding the yield of a farmer’s crop that Tony described to me as unhelpful and frustrating:

I guess the biggest detriment to it all that I’ve found is honesty … You know there’d be blokes around who, the paddock had gone eight bags and I knew it had gone eight bags but they talk about 12 bags and … There’s a big difference between an 8 bag stubble and a 12 bag stubble, so they’re saying, ‘oh yeah, I got mine through a 12 bag’ and I’m sitting there thinking, ‘oh shit, what happens now, do I say well bang on a minute, that paddock only went 8 bags’ – are you going to stand up in front of 40 people and call a bloke a liar. I have come home from [field] days and said to Marg, “well that’s the last one that I’m going to”, because until people get honest,
and then they complain about not getting some work put into that area but if they were honest, it would get put into that area.

In the light of Smith’s analysis of the redistribution of wealth within the broader agricultural industry, it seems clear that the notion of farmers being in competition with one another is of more benefit to the non-farming sector than it is to farmers themselves. The lack of cooperative arrangements between farmers makes the political task of retaining wealth and influence more difficult as a smaller number of non-farming actors increase their share of the industry’s wealth. There appear to be conflicting responses to the question of cooperation within the community. Several of my co-researchers, Trish in particular, argue that there are high levels of cooperation and that this is vital for isolated and sparsely populated communities. The sorts of cooperative acts talked about largely concern non-farming activities: social activities such as sporting clubs and services like fire-fighting and ambulances. Cooperation for economic gain or to improve farming practices seems less common; Kate feels that ‘we don’t band together enough’, while Marie bemoans the lack of a local forum for communication and cooperation. Perhaps the values attached to independence and self-reliance, outlined above, and a reluctance to admit to difficulties means that farmers are less likely to actively cooperate on farming activities.

Walter (1997, p. 49) argues that the dominant image of the successful farmer in the era of industrialized agriculture is one of ‘individualism, maximum production, and technical efficiency’, values that represent a commercial revision of romantic, agrarian mythology that valorized ‘independence, hard work and self-reliance’.

In his study of farmers in Illinois, Walter finds that definitions of farming success are more variable than this argument might suggest, with personal and family goals, life ‘stage’ and other demographic aspects among the contributing factors. Coldwell (2007, p. 92) points to a body of research that identifies rural masculinities as still being constructed

Executive Link™ is an attempt to encourage greater cooperation between farmers. Farm businesses that join Executive Link™ are arranged into Boards and several Boards make up a Chapter. The members of each Board attend regular training and educational meetings and act as an advisory body to each individual farming business. I sent each of my co-researchers a copy of a paper (Kilpatrick, Bell, & Falk, 1998) on Executive Link™ as a means of facilitating group learning and building social capital and sought their comments as to whether a similar approach might be of interest to them. I received no response.

The same values are identified by Thompson (1995, 2004) as contributing to the development of productionism as the defining ethic of industrialized agriculture. See chapter one.
according to ‘traditional values’ that perpetuate ‘hegemonic masculinity’: values associated with ‘controlling nature, of toughness, hard work and self-denial’. In his own research and that of others though, Coldwell sees evidence of reflexivity enabling a more dialogic masculinity in which farming men are more open to honest discussion, to admitting mistakes and to acknowledging emotions. These are the sorts of identities he argues, that are needed if farming communities are to resist the most damaging aspects of industrial agriculture and develop more sustainable practices and cultures. Bell however (cited in ibid., p. 92) suggests that uncertainty, a common aspect of many farming lives, mitigates against the development of new identities, rendering monologue a ‘refuge … against the loss of a sense of self’.

Following Burton’s (2004) lament that agricultural researchers had been slow to acknowledge the importance of identity and symbolic meaning, rural sociologists at least appear to have taken up his suggestion\(^\text{73}\). Questions of identity and symbolic meaning however do not appear to have made a great impact in agricultural studies outside of rural sociology. This is perhaps simply a symptom of the difficulty experienced throughout the academe in developing genuinely transdisciplinary approaches to research (Cundill, Fabricius, & Marti, 2005). It strikes me that some of the ‘traditional’ values of the good farmer identified above, like independence and self-reliance, have not always served farmers well and that such values have been exploited, not necessarily intentionally, by those interests better served by a neoliberal agenda.

**Landcare and Natural Resource Management**

The last thirty plus years have seen a range of programs enacted under the banners of Landcare\(^\text{74}\) and Natural Resource Management (NRM), with varying levels of government funding and models of governance. Curtis and Lefroy (2010) write that the first ‘formal’ response to NRM issues in Australia began in 1936 with the formation of state-based soil conservation committees. For most authors the more recent history of government funded NRM began in 1989 when the Hawke-led

\(^{73}\) Web of Knowledge (accessed 18/4/13), records that Burton’s 2004 paper has been cited 98 times.

\(^{74}\) Compton and Beeton (2012) point out that there are numerous different ideas about what the term landcare means. I will refer to Landcare with a capital L as including all government sponsored programs.
The federal government committed $360 million to the National Landcare Program (NLP), with the aim of fostering among landholders an ethic of stewardship and the adoption of more sustainable farming practices (Curtis, 1998; Simpson & Clifton, 2010). The NLP itself was preceded by years of informal community group activity (Compton & Beeton, 2012), particularly in Victoria and Western Australia (Lockie, 1999b). Prompting the NLP was a proposal from a seemingly unlikely partnership between the NFF and the Australian Conservation Foundation (Lockie, 2004) that offered the promise of cooperation between two groups who were traditionally at loggerheads.

The emphasis in the NLP on individual action, Lockie (1999b) argues, was consistent with the neoliberal rationality of governance with which the federal government was aligned. Economically rational actors it was believed, would ‘naturally act to protect their resource base’ given the right information and its ‘correct’ interpretation (ibid., p. 605). Following the NLP was the more ambitious National Heritage Trust (NHT) iteration of NRM, which used funds provided by the partial sale of the national telecommunications provider, Telstra, in a policy initiative of the John Howard-led coalition government elected in 1996 (Robins & Kanowski, 2011). The NHT program focused on funding more on-ground work than had taken place under the NLP and in its second phase beginning in 2002-2003, 56 Natural Resource Management regions were established to channel funds and co-ordinate agency support (Simpson & Clifton, 2010). The subsequent NRM iteration, Caring for our Country (CfoC), was introduced in 2008 with a lean transition year in which NRM regional bodies experienced a 40% cut in their budgets (Simpson & Clifton, 2010).

Tensions over the appropriate governance arrangements for NRM have been apparent throughout this period. For the state the challenge has been to incorporate environmental (Taylor & Lawrence, 2012) and social concerns (Higgins & Lockie, 2002) into agricultural policy whilst maintaining a broadly neoliberal approach that regards rural Australia as essentially a site of economic activity. Curtis and Lefroy (2010, p. 139) describe the shifts in impetus over this period ‘from high-level national coordination to state-based authorities, then local-level community groups,'
“cooperative environmental federalism” focused on bioregions, and most recently a return to top-down national coordination.

The ‘regional model’ of NRM operating under the NHT funded program was in place during my field work. For Juliette it represents a significant improvement over previous models in that it is less project-based and results in everybody working together within a catchment. She cautions that if the regional model were to be abandoned there would be a big ‘dropout’ of people involved. Intended to promote greater effectiveness, community engagement and responsibility, the regional model is consistent with attempts at devolution and regionalization introduced in other industrialized English speaking nations (Lockwood, Davidson, Curtis, Stratford, & Griffith, 2009). Curtis and Lockwood (2000, p. 64) argue that calls for increased community participation ‘reflect concerns about the legitimacy and efficacy of modern systems of representative government’. They also note that greater participation may just as readily provoke conflict as resolve it, particularly when communities and agencies perceive the purposes of participation differently.

For Wallington and Lawrence (2008, p. 280), the promise of mutual responsibility embodied in the regional approach to NRM has been undermined by the dominant role of central governments in determining priorities, which leaves regional bodies responsible, read accountable, for the attainment of pre-determined outcomes that are focused on the biophysical, whilst ‘the social elements of the institutional design and management practices are all but ignored’. Regional bodies become bureaucratic, managerialist and business-like, engaging with social outcomes only as a means to an end: the attainment of targets. As a consequence, ‘the kind of substantive public ends valued by regional communities’ – like those identified by my co-researchers – are disregarded (ibid., p. 283). It seems reasonable, they argue, that in these circumstances farmers and others might choose not to participate.

Writing from a European perspective, Pellizzoni (2004, p. 542) argues that the environment has been a testing ground for several decades for new forms of governance that have been largely disappointing both in improving environmental ‘performance’ and in ‘the recovery of institutional and corporate legitimacy and trust’. 
Examining different dimensions of responsibility as a means of analysing environmental governance, Pellizzoni suggests that there has been a significant shift in focus from care, to liability, and ‘above all accountability’ (ibid., p. 541). For Lockwood et al. (2009, p. 182) NRM bodies ‘are being stretched on a rack’ between onerous upward accountability requirements and a ‘downward imperative for community ownership and involvement’. The failure of these governance arrangements Pellizzoni argues, can be traced to an ‘inability or unwillingness’ to engage with the increasing relevance of uncertainty as a defining feature of situations. And it is the fourth dimension of responsibility, responsiveness, which he argues, offers more promise as means of assessing effective approaches to environmental governance.

Higgins and Lockie (2002) consider the argument that discourses around ‘“participation” ’ and ‘“partnership” ’ in NRM represent a withdrawal of the state and a strengthening of neoliberal ideals. They suggest instead that the governance of NRM may be more usefully described as an ‘advanced liberal’ approach consisting of ‘an assemblage of rationalities and technologies’ (ibid., p. 420). Drawing on the work of Dean they identify two types of technologies: ‘technologies of agency’ and ‘technologies of performance’, noting that the two are not necessarily mutually exclusive. Technologies of agency are designed to improve the ‘economic capacities’ of individuals through expert guidance. In the case of NRM, property management planning (PMP) is one such technology. Technologies of performance enable devolution of responsibility from state bureaucracies to various agencies and individuals while helping to ensure that those implementing programs ‘act in ways that contribute to the success of programs’ (ibid., p. 421). Tools such as audits, best practice and statistics are familiar technologies of performance. Such technologies enable governing through ‘action at a distance’, a more ‘diffuse’ form of power that is nonetheless effective (Lockie, 1999b, p. 604).

For Lockie, PMP was a particularly effective approach in that it was based ‘on apparently objective knowledge [that] obscured the particular social projects implicated in the production of that knowledge’ (ibid., p. 607). The various technologies of knowledge used in monitoring and planning activities generate
considerable amounts of data, which to be useful, must be seen through an ‘interpretive frame’ (Lockie, 2004, p. 53). In agricultural settings these frames are created through trials of fertilizers and pesticides that generate information supporting ‘high rates of input use to maximize production’ (Lockie, 1999b, p. 607), while such high-input practices are also promoted as ‘the most sustainable ones available’ (Lockie, 1999a, p. 225). Forms of knowledge favoured by agricultural science thus create a model of the farm as a simplified ecosystem without the mediating effects of living organisms, a model in which high-input farming seems the rational course of action. For the individual farmer, rejecting this particular interpretive frame runs the risk of jeopardizing the support of peers, government and industry and the research and development funds they provide.

The promise of greater autonomy and openness for regional groups and stakeholders more broadly, has been stymied by a lack of real decision making power outside of central governments and various forms of institutional resistance. Recent analyses of the latest national NRM program CfoC for example, identify increasing central control at the expense of the regions and a significant increase in transaction costs for regional and local organizations seeking funds (Robins & Kanowski, 2011). Simpson and Clifton (2010) note that the lack of attention to local concerns in the CfoC has resulted in Landcare groups ‘re-badging’ their goals and objectives to align them with the priorities outlined in the CfoC Business Plan. They also report that many groups are increasing the amount of funds applied for to help offset the time and costs involved in making applications and the likelihood of applications failing in what has become a competitive process.

Allan and Curtis (2005, p. 423) describe the development of a culture of NRM that ‘values activity, control, comfort and clarity over reflection, learning, and embracing complexity’. This is a culture driven by a number of ‘imperatives’ that value the smooth operation of the organizational ‘machine’ and the attainment of milestones over an engagement with learning and change. Analyzing prevalent metaphors in NRM discourse, Allan (2007) argues that the widespread use of ‘journey’ metaphors reveals an interest in movement and activity while concealing the rationale behind such activities. Journey metaphors can also be found in the transcripts of my
interviews although not quite in the same context Allan describes. Tony for example talks about the value of soil testing, remarking that ‘at least now we can see where we’re heading’. While Trish says that despite her disappointment at the death of many of the trees she and Graeme had planted, ‘we’re ever optimistic that one day we’ll get there’. Further difficulties have also arisen following the formation of up-scaled regional NRM bodies which have exposed differing priorities; differing ways of working; even different languages being used throughout the various organizational layers (Prager, 2010; Taylor & Lawrence, 2012).

Woodhill too expresses a concern with the culture of Landcare. While acknowledging that it has enjoyed considerable success in community engagement, Landcare, he writes, ‘has failed to engage with the structural causes of land degradation and has not facilitated any significant learning about them’ (Woodhill, 2002, p. 327). He argues that a paradigm of social learning is better equipped for a reflexive assessment of the ‘institutional, political economic and democratic constraints to NRM’ (ibid., p. 322).

Co-researchers’ experiences with NRM

Marie was heavily involved in the development of a catchment management plan for the Bremer River catchment, believing in the value of the exercise and feeling motivated to be involved with the community. While not underplaying the positives she was particularly frustrated with certain aspects of the project, including the public consultation process, which was promoted as central to the development and implementation of NRM projects. In order for federal funds to be accessed organizations such as SCRIPT (later to become SCNRM) had to meet various criteria which included the engagement of the community ‘to garner its collective knowledge, experiences, expertise, creativity and wisdom’ (SCRIPT 2005a, p. 6). Marie’s experience of attending one of the public forums was that she had been invited to approve decisions that had already been taken. Similar comments citing a lack of engagement or adequate communication are recorded in an appendix to the Southern Prospects report:

*Strategy perceived as a technical dump - top down delivery.*
Needs to be a lot more communication with local user groups - there has been no communication with user groups in the Albany or Denmark Shires. If you don’t involve these people, a lot of local knowledge and expertise will be lost. Communication spells the key to success!

Local Government and industry groups are not well engaged at present, it cannot be emphasized enough how big a challenge this is to the success of the strategy. (SCRIPT, 2005c)

It is worth noting also that the attendance records of the consultation forums held as part of this process reveal that in many cases, farmers and landholders were significantly outnumbered by employees of government departments, SCRIPT and other organizations (ibid.).75

As part of the development of the catchment management plan Marie was also employed to survey the local community. Feeling only partially qualified for the position she felt let down by a lack of agency support. The importance of support staff and the inadequacy of their funding and training are widely cited in the Landcare literature as impediments to long term success (see for example, Byron & Curtis, 2001; Compton & Beeton, 2012; Curtis, 1998; Lockwood et al., 2009; Prager, 2010; Simpson & Clifton, 2010). Marie described the survey itself as ‘ghastly’, overly long and poorly designed when it came to analysing the data. Further difficulties arose later in the process:

Well really really simple things like get that map digitized and returned to the farmers completely stuffed up. What got returned was abh, so badly done, the graphics on it you couldn’t actually tell whether it said a fence or a creek line or a tree belt, actually it was very difficult to read. And through the whole process the big carrot to get the farmers to do it, it’s alright, “all this process we know we’ve dragged you to these meetings and we’ve had half day workshops and all the rest of it, don’t worry at the end of it you’re going to get a big beautiful fat glossy picture, all yours”.

…

75 At a forum held on July 7, 2004 in Jerramungup there were 20 attendees, of whom 5 were local farmers (including 4 of my co-researchers) and 11 employees of SCRIPT and/or the state Department of Agriculture (South Coast Regional Initiative Planning Team (SCRIPT), 2005b).
Consistent with Lockie’s finding that NRM has not challenged the state’s commitment to agricultural intensification, Marie’s experience with the development of the Bremer Catchment Management Plan was that the process was most strongly influenced by the Department of Agriculture (now the Department of Agriculture and Food, DAFWA) as they were the only agency or organization that was funded to participate:

> Unfortunately that was all pushed by the department of agriculture and what was the wrong thing about the 20 year project was that other groups that were meant to be equally engaged, weren’t yet funded and therefore were not engaged to be part of the pre-planning … So the department of agriculture’s agendas got pushed, and you got lucerne planting and all this stuff, you got your perennials, it was a huge push.

Aside from the personal disappointment what concerns Marie is that the community loses trust and interest in these kinds of projects:

> the community doesn’t allow you to have too many hits at them, if you bugger it up the apathy and the difficulty to approach it again is huge. And I was really conscious of that because I put my name on the line in the district to push it, because I genuinely believed the purpose of it and again it was argh … As a department of agriculture employee would feel, bugger the process, I’m dealing with the coalface here.

Marie recounts here several aspects of NRM activities that have tested the patience of many in the local community. The last comment above suggests that there is a real danger of losing the trust and cooperation of many farmers if such experiences are repeated. Lockwood et al. draw attention to the negative consequences of the often onerous accountability procedures for those involved in NRM. Accountability reporting, they argue, ‘can cause lasting disaffection and frustration ... wearing down community effort, especially given a heavy reliance on goodwill and voluntary engagement’ (Lockwood et al., 2009, p. 176). Byron and Curtis (2002) warn that NRM activities in Australia may be nearing the limit of what is achievable through largely
voluntary efforts. Particularly for those most heavily involved in NRM a combination of factors is contributing to growing disillusionment and burnout. Byron and Curtis argue that high time commitments, a lack of agency support and a failure to adequately address group management issues are taking an emotional toll, and must be considered against a backdrop of declining terms of trade and the growing marginalization of many rural communities (Byron & Curtis, 2001, 2002; see also Byron, Curtis, & Lockwood, 2001).

It seems to me that Habermas’ theory of the colonization of the lifeworld by systems sheds some light on the experiences of those involved in NRM at a local and regional level. Habermas (cited in Kemmis, 2001, 2008) proposes that goal directed organizations and institutions employing a ‘functional rationality’, which he calls systems, colonize the social and cultural processes that sustain the lifeworld with the result that individuals may come to identify their aspirations in systems terms. Particularly for those local and regional bodies involved in NRM that began life as small organizations responding to local concerns and which initially operated with a considerable degree of autonomy, current arrangements require them to operate within systems of accountability and decision making that demand the application of bureaucratic structures and logic. As argued above, local interests may need to be ‘re-imagined’ if they are to meet funding criteria determined in distant settings. I recall a conversation with an informant who was closely involved in setting up SCNRM, the regional body responsible for NRM along the south coast of Western Australia. He told me that he regretted the fact that those involved had settled on the idea that the organization was best managed by a Chief Executive Officer rather than by someone with a more creative role. The appointment of a CEO reinforces the culture of operational efficiency identified by Allan and Curtis (2005), at the expense of developing a more imaginative organization that is not afraid to take risks and to make mistakes.

**Disaffection and frustration**

Disaffection and frustration among my co-researchers and rural Australians more broadly is not restricted to the machinations of NRM. I have already recorded some
of the emotional responses of my co-researchers to economic arrangements that leave farmers as price takers, to agricultural research organizations that focus on short term research projects guaranteed to ‘succeed’, to a growing divide between urban and rural dwellers, to the continued dominance of ‘conventional’ chemical and fertilizer companies and the lack of support and advice regarding alternative approaches to farming. Additional concerns have also been expressed over a lack of services in telecommunications and broadcasting. These concerns cannot, I argue, be dismissed as the everyday whining of those who’d always like a little more. People living in regional Australia have experienced the erosion of infrastructure and services, employment and educational opportunities that most urban dwellers take for granted (Alston & Kent, 2009).

At a range of levels, my co-researchers and other farmers, experience significant frustration, disaffection and stress as a result of institutional and organizational relationships. For two of my co-researchers their experience is that ‘nobody listens’. A re-imagined future for Australian farmers that regards rural communities as complex human communities with values, interests and needs every bit as rich as those found in our cities, seems unlikely in the face of entrenched institutional norms. Alston (2012, p. 237) writes that,

> There is a sense among rural people that their views have been ignored, that they are somehow responsible for the environmental concerns of the community and that they are being asked to bear the brunt of government policies to address climate change adaptation. This has led to a growing sense of alienation from governments and from the rest of the community and a growing sense of distrust of governments and institutional mechanisms. Rural and remote people feel disenfranchised.

Alston describes a disaffection that extends beyond those directly involved in NRM, suggesting a pervasive emotional and affective malaise that may be hard to shift for as long as policy and structural settings continue to favour urban Australians. As Burkitt (1997, p. 50) writes; ‘the entire emotional habitus of a social group is linked to the power and status structure of society’.
There is perhaps little new in these observations. What I would like to suggest here though is that any future in which rural Australians enjoys a more satisfactory set of relationships must attend to the emotional quality of these relationships, recognizing their needs as people, who also happen to be economic actors and land managers. As Alston puts it,

Creating and maintaining a vibrant agriculture is dependent on vibrant communities, well resourced people, adequate industry and business support, optimal service infrastructure and attention to sensitive policy development that rewards and supports people who live and work in these areas and who have the same citizenship rights as people in the cities. (Alston, 2012, pp. 237-238)
Chapter 6: Soil and the health metaphor

In this chapter I return to the topic that I began this project with: soil health. That I have not discussed soil health thus far is not a reflection of my lack of interest. Soils and our attitudes to them seem to embody many of the difficulties and dilemmas we face in our relationship with nature. Our dependence upon soils for the provision of food and the disposal of waste is hidden by the brilliance of our technological and industrial food production systems which regard soil as simply one of several inputs, and in some cases one that is ultimately substitutable. Modern agronomy has taken the life out of the soil, severing our ancient connections to the soil as the symbol of fertility (Thompson, 1995). For those like Thompson and Berry, who seek to address our destructive relationship to soil, we are in need of an agricultural ethic that honours our dependence and that is true to the ‘spirit of the soil’ (ibid.).

Soils are also at the heart of farming in a more literal sense. Plants, both crops and weeds, and the animals that eat them are all nourished by the soil. Nutrient profiles and the relative availability of soil-held water and air are key determinants of the health and productivity of crops and livestock and their skilful manipulation is central to the farmer’s practice.

While conversations with my co-researchers regarding soil health were relatively few I spent a considerable amount of time studying the soil health literature. My initial interest in the practical tools of soil health research gave way to an interest in the ways that this body of research framed soil in narrow terms consistent with a mechanistic and productivist outlook. Following Berry’s interest in language and metaphor I began to think about soil health in terms of the unacknowledged values and assumptions that informed the research and the lack of attention being paid to the more creative potential of the health metaphor. Continuing the theme of exploring institutionalized practices and policies in agriculture, in this chapter I look at the way that soil health research has largely reproduced dominant images of soil as a source of human welfare to be exploited.
The health tag is widespread across a range of fields beyond the medical disciplines: examples include agroecosystem health (Faye, Waltner-Toews, & McDermott, 1999; Gallopín, 1995; Xu & Mage, 2001), river health (Boulton, 1999), island health (Binns, Hokama, & Low, 2010), ecosystem health (G. A. Albrecht, 2001; Ehrenfeld, 1992; Lackey, 2001; Rapport, 1995; Suter II, 1993), ocean health (Lester et al., 2010) and soil health (Doran, Sarrantonio, & Janke, 1994; Doran, Sarrantonio, & Liebig, 1996; Doran & Zeiss, 2000; Karlen, Andrews, & Wienhold, 2004; Kibblewhite, Ritz, & Swift, 2008; Romig, Garylynd, Harris, & McSweeney, 1995; Sarrantonio, Doran, Liebig, & Halvorson, 1996; Sherwood & Uphoff, 2000). Health clearly seems to resonate with many researchers across a variety of discourses in the natural and environmental sciences, particularly those seeking to engage with the concerns of interested non-scientists. In situations where a link can be made between environmental conditions and human well-being, broader notions of health offer a means to attract attention when environmental approaches fail to engage. While widely considered in these cases to be a metaphor, most authors appear unwilling to explore the creative potential that the health metaphor holds. Many researchers exploit our familiarity with the idea of health while paying scant attention to what the metaphor entails or to the role of metaphor more broadly.

The metaphorical usage of health arises, suggest Freyfogle and Newton (2002), as a result of its narrow application within science as being the property solely of an individual. Beyond the confines of science health is used literally to describe ‘modes of functioning that are thriving, vigorous, and growing in desired ways’ (ibid p. 867). Health in this sense is being used as an evaluative standard or goal. Within the soil health literature there is little evidence of the word being used either metaphorically or as a standard, yet as I hope to show, a broader consideration of health might prove fruitful in furthering some of the stated aims of soil health research. I have no intention in this essay to conduct a comprehensive review of soil health; my intent is to highlight certain aspects of the literature revealed by a more ‘poetic’ reading of the idea of health. I offer my comments as a participant in a conversation concerning the future of food production and our relationship to nature. My view is that farming is best understood as a complex human activity that takes place within broader social,
political and ecological contexts, rather than one that is seen as a set of technical practices. As Woodhill and Röling (1998, p.46) put it, the heart of environmental management issues lie not within the ‘environment’ as such, but are better ‘understood in terms of competing values, beliefs, perceptions and political positions’.

**Why metaphor?**

In chapter one I argued that metaphors are pervasive in both scientific and ‘everyday’ discourse, shaping not only our speech and writing but also our thoughts and actions. One of the strengths of working with metaphors is the way they bring to the surface the values that are all too often hidden beneath a veneer of objectivity. The work of the American wildlife scientist and writer Aldo Leopold provides an example of model-building rich with metaphors. In the oft cited essay *Thinking Like a Mountain* Leopold (1949, p. 130) uses the metaphor to explore scales of time, contrasting his own short-sightedness at pumping lead into a wolf pack ‘with more excitement than accuracy’, with the longer term view that leads him to think of the mountain as living in fear of its deer.

At the risk of a gross simplification I want to mark out two broad and interacting applications for metaphor in practice: one revelatory and the other creative. If we accept the argument that metaphors structure our thoughts and actions then the study of metaphors-in-use can be a powerful tool for engaging with people and helping to reveal their understandings (McClintock et al., 2004). This may be especially useful where there are a multitude of perspectives and understandings within a group of people. In particular, metaphors can be examined for their entailments, for the ‘ideas and associations entailed in thinking in a particular way’ (Lakoff & Johnson, 1980, p. 34). Whether acknowledged or not by the user, metaphorical entailments are a potentially rich source for discussion of current ideas and understandings. At the same time, reflection upon metaphors-in-use can generate a variety of new understandings and perspectives, particularly when exploiting the ambiguity of words and the generative capacity of dialogue.
For Lakoff and Johnson metaphor provides a powerful critique of the myth of objectivism by situating meaning within conceptual structures, which are metaphorical in nature. Meaning, in this view arises through our interaction with the world rather than being inherent in the world. It is this undermining of the idea of a singular truth that lends metaphor its creative capacity, and which unsettles those committed to the idea of objective meaning. Smith (2003, p. 77) identifies ‘science proper’ with truths that enable prediction and ‘facilitate control’; truths best expressed by mathematics, number being ‘the language of science’. The truths of science proper however owe their survival to the exclusion of so much incompatible knowledge and to a distrust of the ambiguity of words. Metaphor presents a challenge to the truths of science proper and to the notion of objective meaning while protecting against a sterilisation of language that would ‘rid it of the humus of adumbration and allusion that makes it fertile and capable of reaching into every crevice of the human soul’ (ibid, p. 100).

In light of the arguments outlined it should be clear that it makes little sense to talk of metaphors as being true or false, right or wrong. As Proctor and Larson (2005, p. 1067) suggest, ‘metaphors are best interrogated in terms of the understandings they afford and those they preclude ... what understandings it reveals and obscures’. The philosopher Mary Hesse (1988, p. 9), who argues that ‘all language is metaphorical’, suggests that while some metaphors may have truth-value in certain settings, ‘the appropriate response is not verification or falsification, but rather meditation’.

The very beginnings of modern science were founded on a metaphor: the image of nature as a machine (Abram, 1991). Scientists, philosophers and theologians, among them such figures as Descartes, Galileo, Kepler and Hobbes, showed the world as a giant clockwork, at once predictable, understandable and manipulable (D. R. Keller & Brummer, 2002). Descartes made clear the distinction between human and nonhuman nature: only humanity could be accorded intrinsic value; nonhuman nature possessed only instrumental value for human ends (D. R. Keller, 2009). Together with

Rorty (1980, pp. 388-389) sounds a similar warning about the risks to a fully human life posed by a "scientism" that seeks ‘objectively true or false answers to every question we ask, so that human worth will consist in knowing truths, and human virtue will be merely justified true belief. This is frightening because it cuts off the possibility of something new under the sun, of human life as poetic rather than merely contemplative.’
the modernist assertion that ethics and values have no place in science, the doctrine of the fact-value gap, mechanistic metaphysics has underpinned a narrow economic relationship between man and nature, illustrated by the productionist paradigm that reduces agriculture to the practice of maximising output. Visions of nature as a machine remain very much alive. Kibblewhite, Ritz and Swift (2008, p. 691), for example, draw on operations management theory and a view of a healthy soil as ‘one that presents a satisfactory system performance’ that can be visualized as ‘system performance curves’:

The working range of the soil system is that over which there is no degradation of system performance in terms of input-to-output conversion efficiency with increasing outputs. Above this range, performance deteriorates as indicated by falling efficiency, but as long as the level of inputs do not exceed the working range greatly, no permanent damage occurs ... The capacity of the soil system to deliver goods and services is defined by the extent of the working range and the input-to-output conversion ratio at the upper limit of the working range. (ibid., p. 691)

Arguing that the goal of environmental sustainability requires soil function to be better represented in decision-making tools, Robinson et al. write:

In conventional economics the production of an output requires ‘factors of production’ which are the inputs. For instance in car manufacture this might include the raw materials, steel, plastic, wood, and rubber etc. as well as the assembly line, robots, presses and other machines. The raw materials are fundamentally transformed and used up in production, whereas the machines in the assembly line are basically unaltered by the process, just a little worn, but not fundamentally altered. So it is with ecosystems... (Robinson et al., 2012, p. 1026)

Those concerned with developing new ways of feeding ourselves are alive to the power and importance of metaphor. Mora Campbell recounts the food theorist Kenneth Dahlberg’s response to a question of how to counter the degrading trajectory of the contemporary agro-food system. ‘He supposes’, Campbell writes, that what we really need are new metaphors to describe our relationships to farming and food. Metaphors, he said, touch us at deep emotional and aesthetic levels, and can thereby powerfully reconfigure how we experience and understand the world. (Campbell, 1998, pp. 57-58)
I agree with Dahlberg and would add that not only do we need new metaphors, we should also be aware of the dominant metaphors-in-use, be they ‘disabling’ (McClintock et al., 2004) or charged with the potential for creating new understandings. Rorty (1989, p. 9) too alerts us to the potential of new ways of talking:

Interesting philosophy is rarely an examination of the pros and cons of a thesis. Usually it is, implicitly or explicitly, a contest between an entrenched vocabulary which has become a nuisance and a half-formed new vocabulary which vaguely promises great things.

**Why health?**

A major attraction of the health metaphor is that it explores what Callicott (1999) calls the ‘middle path’ between what are usually regarded as mutually exclusive alternatives: the objective and the normative. Since Foucault perhaps, it is widely recognized that human health is more than an objective condition: that health and illness are in many ways socially constructed (Gwyn, 2002). What’s particularly important here is the idea that discourses around health become open to all interested parties, offering an opportunity for cooperation and dialogue between laypersons and experts. Waltner-Toews (1996, p. 688) makes a similar point when he states that the importance of a suitable language for public discourse ‘cannot be overemphasized’. Ehrenfeld (1992, p. 142), while wary of the value of health as a ‘scientific tool’, regards it as a ‘bridging concept’ that ‘can enrich scientific thought with the values and judgements that can make science a valid human endeavour’. For Karr (2000, p. 212), the health concept is useful because it is familiar. While arguing for the need to define it and measure it, our familiarity with health means that it ‘has a fighting chance of engaging public interest and support’.

One of the strengths of the health metaphor is that it carries with it an invitation to action, or at the very least concern; our natural reaction to someone being unhealthy is a desire to see them return to good health. This is because we value health, ‘intrinsically as well as instrumentally’ and would not compromise our own health or the health of others without sufficient justification (Callicott, 1999, p. 355). Nelson (1995, p. 313) expands on this idea, arguing that health and illness, alongside
‘treachery’ and ‘brutality’, are ‘thick’ concepts that are not only descriptive, but also prescriptive of ‘a certain range of responses’, because they contain an ‘evaluative force’. Thus the use of health language helps to make the case for a view of ecosystems (or soils) as having a value ‘that is not reducible to human preferences’ (ibid, p. 312).

In response, Norton\(^77\) (1995, p. 331) argues that nonanthropocentrists like Nelson wrongly assume that the only truly moral basis for environmental policy lies outside of humanity, that is in positing an intrinsic value to nature. Norton argues that obligations to future generations provide ‘warrantably assertible values and goals’ that while anthropocentric ‘are not based in the preferences of individuals’. Norton outlines a moral pluralism in which values can be sorted according to scales. Where higher level values are threatened, ‘moral obligations can override preference-values’ (ibid., p. 331).

Freyfogle and Newton (2002, p. 864) make use of two distinctions in seeking to clarify the role of science in the ‘complex, human guided enterprise’ of land management. The first distinction, description versus evaluation, differentiates the task of describing the world, the role of science, from the normative task of deciding whether a particular landscape is good or bad. The second distinction, substance versus process, alerts us to the differences between the standards used in the task of evaluation, and the varied processes used to formulate and apply those standards. These ‘substantive evaluation standards’ can be broken into three overlapping components: 1) human utility, broadly defined to include aesthetics; 2) respect or virtue, as considerations of our relationship with nature; and 3) humility or precaution, which takes into account our limited knowledge and understanding (ibid., p.866). The authors note that in practice, standards or goals might involve varying combinations and numbers of these components. They also seek to disabuse us of the idea that standards for land management fall into two neat camps: the anthropocentric and biocentric.

\(^77\) Both Nelson and Norton point out that Callicott himself has since backed away from the argument that health is at once ‘objective and normative’.
Health, for Freyfogle and Newton (ibid., p.867), is a metaphor when the question is ‘one purely of science’, but is otherwise a substantive evaluation standard. Health is used literally outside the confines of science to describe modes of desirable functioning, such as in community health and public health. Historical usages seem to support this idea; the terms community health and public health date back to nineteenth century. In Reflections on the revolution in France published in 1790, Edmund Burke wrote of ‘the healthy habit of the British constitution’, while the cutlery trade was described in a newspaper in 1897 as being ‘in a very healthy state’ (OED).

For Rapport (1998) the value of the health metaphor lies in the cross-disciplinary associations that are created and its use as a communication device. While wary of certain aspects of conventional biomedicine, Rapport’s description of ecosystem health as a practice draws heavily on medical associations and language. ‘In both cases’, he writes, ‘one needs to assess the loss of function, to diagnose probable causes ... and to determine the appropriate interventions’ (ibid., p. 20). The health metaphor, Rapport argues, ‘represents a powerful tool for suggesting methodologies already in place in the health sciences that have applications to evaluating dysfunction in ecosystems’ (ibid., p. 20).

As a communication device the metaphor draws on our familiarity with aspects of health care like screening, diagnosis and monitoring. Thus it is readily understandable Rapport suggests, ‘that a very similar goal-oriented process is applicable to evaluating ecosystem condition’ (ibid., p. 20). Of interest here is that Rapport draws upon familiar models of both health practice and communication that are rooted in particular traditions. This model of health practice fits with what Schön (1995a, p. 29) describes as ‘“technical rationality”’, practice that is ‘instrumental, consisting in adjusting technical means to ends that are clear, fixed, and internally consistent’. Allan (2007, p. 360) argues that the use of health metaphors in the natural resource management discourse promotes a view of identifiable illnesses that require expert diagnosis and technical treatments ‘with the landscape equivalent of drugs or operations’. Such a view conceals alternative perspectives and ways of knowing while leaving non-experts vulnerable to manipulation and persuasion by those in the know. While Rapport regards the land health concept as useful in helping to determine
societal values, once these are determined ‘it becomes a scientific question to determine which human activities are compatible with maintaining these values and the continuity of the ecosystem’ (Rapport, 1995, p. 300). Rapport acknowledges the importance of stakeholder involvement in ecosystem management but fails to provide a clear account of how societal values and ethical considerations are to be incorporated into the ongoing practice of ecosystem health. Such an account would need to incorporate a concept of communication as dialogue or conversation; in metaphorical terms this fits with what Krippendorf describes as the ‘dance-ritual’ metaphor (cited in McClintock et al., 2004). More commonly, as is the case above I suggest, communication and language are modelled on the conduit metaphor, in which the ‘speaker puts ideas (objects) into words (containers) and sends them (along a conduit)’ (Lakoff & Johnson, 1980, p. 10). Within the conduit metaphor meanings are fixed and communications are sent, and disruption and creativity are discouraged.

**Soil health**

The terms soil health and soil quality are commonly regarded as being synonymous (see for example Doran et al., 1996; Pankhurst et al., 1995), within what is a relatively recent branch of the soil and agricultural sciences. Several key factors appear to have stimulated the development of soil health and soil quality research: in particular the recognition of the many functions soils perform beyond their role agricultural production and the widespread degradation of the world’s agricultural soils as a result of human activity (Doran, 2002; Weinhold, Andrews, & Karlen, 2004).

Soil quality research has focused on the development of indicator suites or minimum data sets that represent a composite of chemical, physical and biological properties, with an emphasis on those properties that respond to management interventions (Andrews, Flora, Mitchell, & Karlen, 2003; Andrews, Karlen, & Mitchell, 2002; Wander et al., 2002). The central concept in soil quality is that of soil *function*, and this is reflected in the widely cited definition of soil quality as ‘the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain
plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation’ (Karlen et al., 2004).

Several authors draw attention to differences between soil quality and soil health. Doran et al. (1994, p. 232) for example use the terms synonymously but prefer soil health for its portrayal of the soil as a ‘living dynamic organism’ rather than as an ‘inanimate object’. Carter et al. (1997, p. 7) regard soil health as being useful in talking about the ‘goals’ and ‘values’ society places upon it and in assessing and comparing the condition of a soil against certain standards. The authors also seek to highlight the living dynamic characterization of soil, preferring the ‘soil-as-a-community’ analogy to that of the ‘soil-as-an-organism’ (ibid., p. 7). Sherwood and Uphoff (2000, p. 87) make a similar case, arguing that soil quality refers to the ‘constituent parts of the soil’ while soil health is associated with ‘holistic soil management’ and presents a more dynamic view of the soil. Rapport et al. (1997, p. 36) however argue that the interchangeability of soil health and quality represents a ‘fundamental misuse of the two concepts’. Soil quality includes inherent soil characteristics, analogous to genetic potential, which should not be included in soil health. Soil health, they write, ‘should strictly include only those characteristics which can be affected by management at scales relevant to managers, e.g. over years, not centuries’. Differing perspectives and research interests, including considerations of the relative importance of language, seem to influence these various positions regarding soil health and quality. What seems clear however is that as a concept rooted in agricultural science, high soil quality denotes value as a result of its productive capacity, while a healthy soil of low quality attracts no such value.

Warkentin and Fletcher (1977) set out a challenging and ambitious program for soil quality research a decade or more before the concept was more widely taken up.

---

78 This definition was developed by the Soil Science Society of America (SSSA) in the mid 1990s. See Karlen et al (2004) and Carter et al (1997) for a brief history of the definition of soil quality. Various authors have developed their own definitions that tend to be very similar to the SSSA’s. For example Doran et al (1996, p. 10) define soil quality as ‘the capacity of soil to function, within ecosystem and land-use boundaries, to sustain biological productivity, maintain environmental quality, and promote plant, animal, and human health.’ Employing the terminology of soil health rather than quality, Kibblewhite et al (2008) write that ‘a healthy agricultural soil is one that is capable of supporting the production of food and fibre, to a level and with a quality sufficient to meet human requirements, together with continued delivery of other ecosystem services that are essential for maintenance of the quality of life for humans and the conservation of biodiversity’.
Anticipating future conflicts over differing uses and values for soils, the authors argue that soil quality needs to incorporate views from outside of its traditional setting. ‘Soil quality’ they write, ‘is not only a technical problem, but a social and institutional problem; not only an agricultural problem but a problem which concerns everyone’ (ibid, p.597). Aware of the challenges posed by new perceptions, they encourage soil scientists to ‘welcome this increased participation as an advantage and not consider it as a nuisance’. Warkentin and Fletcher make clear that decisions regarding land use involve ethical considerations, raising the possibility of soil having intrinsic value and recognizing that the soil quality concept will be shaped by changing cultural and institutional contexts.

The authors conclude with quotes from Leopold and Von Humboldt, who warn us of the limitations in seeing the world exclusively through the prisms of science and economics. Aldo Leopold remains an influential figure in the United States as a scientist, conservationist and writer. In his best known work, *A Sand County Almanac* (1949), Leopold seeks to combine what he knows as a scientist with what he values as a man and as a member of the ‘biotic community’. ‘Health’, writes Leopold, ‘is the capacity of the land for self-renewal’, and ‘Conservation is our effort to understand and preserve this capacity’ (ibid., p.221). For our efforts to succeed humanity must develop an ecological conscience, a land ethic that reflects ‘love, respect and admiration’, and an attitude that requires us to consider ‘what is ethically and aesthetically right as well as what is economically expedient’ (ibid., pp. 223-224). For Leopold these ethical and aesthetic connections to nature are a reflection of our biological dependence, or interdependence with the natural world (Kellert, 2002). In *The Land Ethic* he sketches various metaphorical images to illustrate our interdependence: he writes of ‘land as a biotic mechanism’, arranged in a ‘biotic pyramid’ in which organisms are connected by ‘a tangle of chains’ (Leopold, 1949, pp. 214-215).

For Freyfogle and Newton, Leopold’s concept of land health represents a substantive evaluation standard, one that draws upon the three components outlined above: utility, respect and limits to understanding. Leopold recognized the importance of soil fertility for human utility, and understood conservation as both embracing respect for
the ‘biotic right of other life forms to exist’, and as a wise course of action in light of our ignorance (Freyfogle & Newton, 2002, p. 867).

Leopold’s deep and abiding love of nature, and his acknowledgement of human ignorance, sat uncomfortably at times with his professional role as a scientist. Addressing the Wildlife Society he confessed to entertaining heresies and doubts:

We doubt whether science can claim the credit for bigger and better tools, comforts and securities without also claiming the credit for bigger and better erosions, denudations, and pollutions. We doubt whether the good life flows automatically from the good invention.

The definitions of science written by, let us say, the National Academy, deal almost exclusively with the creation and exercise of power. But what about the creation and exercise of wonder, of respect for workmanship in nature? (Leopold, 1940, p. 343)

Widely regarded today as a classic, Leopold had difficulty finding a publisher for the book and in developing the right blend of styles for his writing (Meine, 2002). That a man with his combination of academic credentials and writing talent found completing the book such a struggle might suggest just how difficult it is to leaven the scientific voice with that of the lover. Leopold reminds us that scientific knowing alone is not sufficient if we want to preserve the health of the land. The changes required to ensure this preservation require that we care. As Meine (ibid., p. 29) puts it, ‘Leopold showed that we may move mountains by allowing the mountains ... to move us’. Reading *A Sand County Almanac* I am reminded that words too can move us. Mourning the extinction of the passenger pigeon, Leopold (1949, p. 109) writes,

Our grandfathers were less well-housed, well-fed, well-clothed than we are. The strivings by which they bettered their lot are also those which deprived us of pigeons. Perhaps we now grieve because we are not sure, in our hearts that we have gained by the exchange. The gadgets of industry bring us more comforts than the pigeons did, but do they add as much to the glory of the spring?

It seems that Warkentin and Fletcher’s call for a more inclusive and pluralistic soil science has gone largely unheeded. While a number of authors acknowledge soil quality’s interests in communication and sustainability (Andrews et al., 2003; Doran et
al., 1994; Doran et al., 1996; Wander et al., 2002), the literature paints a picture of a largely utilitarian and technical practice that struggles to deal with the challenges of breaking free from disciplinary and institutional constraints.

A striking aspect of the soil health literature is that the metaphor is largely unacknowledged. Health has been used as a proxy or as a stand-in for status or condition. Recognition of the richness of the concept of health, as both metaphor and standard, would be a useful step towards meeting some of the challenges set out by Warkentin and Fletcher. A broader concept of soil health would more easily accommodate the diversity of views held without the scientific establishment. The efforts made to define soil quality and health excludes those whose interests are not addressed, or those who do not recognize the language in which the concept is expressed. A critical look at the science of soil health with an ear for metaphor opens the door to ideas about health and healing more broadly, and to a consideration of the language employed. It is within the metaphor I suggest, that a key difference lies between soil health and soil quality.

An awareness of metaphor heightens awareness of language more broadly. If the concept of soil quality is to perform a useful communicative function, to connect farmers, consumers and researchers, language becomes a critical issue. The American farmer and writer Wendell Berry sees language as central to many of the problems within agriculture and society more generally. For Berry (1981, p. 113) the rise of the metaphor of the machine has been ‘the most destructive change of modern times’. While Berry describes this as a change of language, we have seen above how metaphor operates to structure understanding, and how influential mechanistic metaphors remain.

Berry (1992, p. 35) draws our attention to the ways in which scientific language, the product of ‘the juiceless, abstract intellectuality of the universities’ acts to ‘disconnect, displace and disemboby the mind’. The ubiquitous term ‘environment’ is a case in point:

This word came into use because of the pretentiousness of learned experts who were embarrassed by the religious associations of ‘Creation’ and who
thought ‘world’ too mundane. But ‘environment’ means that which surrounds or encircle us; it means a world separate from ourselves, outside us. The real state of things, of course, is far more complex and intimate and interesting than that. The world that environs us, that is around us, is also within us. We are made of it; we eat, drink and breathe it, it is bone of our bone and flesh of our flesh. (ibid., p. 34)

Institutional arrangements

In chapter one I drew on Bourdieu’s understanding that the power behind language stems not from the words alone but also from the social institutions which establish and maintain particular discourses. The stability of such discourses and institutions derives in part from the ‘active complicity’ of those who fail to recognize ‘the hierarchical relations of power in which they are embedded’ (Bourdieu & Thompson, 1991, p. 23) and who thus unconsciously reproduce dominant discourses. However it is through the recognition that these are ‘arbitrary social constructions’ (ibid., p. 23) that alternative sets of relations can be imagined.

Soil quality research is largely a product of the institutions, in the sense of both organizations and the rules and norms they ascribe to, that have developed agricultural extension services. Extension operates on a principle that is metaphorical: that of knowledge transfer. Among the entailments of the metaphor is the idea that ‘research can be conducted outside the context of its application’ (McClintock et al., 2004, p. 26). Research results are packaged and transferred according to the conduit metaphor that regards ideas as objects that are communicated, that is sent, to a hearer who removes the ideas from their container (Lakoff & Johnson, 1980). For McClintock et al. (2004, p. 44) the metaphor is disabling: having concealed the understanding that knowing arises ‘as an active process of being in the world’, rather than through a passive process of receiving knowledge. Freire (1972, 1973), whose work I discussed briefly in chapter two, makes a similar distinction between ‘banking’ education, in which knowledge is...

---

79 Three authors are particularly prominent in the soil quality literature: Susan Andrews, John Doran and Douglas Karlen. All three have published extensively while employed within the US Department of Agriculture.

80 For a more detailed critique of agricultural extension and ways of knowing see Ison and Russell (2000).
deposited in the mind of the learner, and emancipatory education in which the learner actively creates their world.

In chapter one I also recounted Maturana’s realization (cited in Russell & Ison, 2004) that to say something new he needed to invent a new language in which to say it, in order to break free of the ‘trap’ of familiar language. He soon realized however that new forms of language were not understood and that what he needed to do was to interact. Communication as interaction, as conversation or dialogue, suggests a different set of metaphors to those associated with communication as sending and receiving. While Doran et al. (1994) identify communication and partnerships between farmers, researchers, policy makers and consumers as perhaps the most important need for a future agriculture, soil quality research tends to reproduce hierarchical relationships. The voices of farmers, with some notable exceptions (Andrews et al., 2003; Romig et al., 1995; Wander & Drinkwater, 2000), are rarely heard in the literature. When Weinhold et al. (2004, p. 91) write that ‘Soil quality has emerged as a unifying concept for educating professionals, producers and the public about the important processes that soils perform’, it’s clear who is doing the educating and who are the learners. For any idea to become a unifying concept requires that a broad range of interested parties can all claim some ownership of the idea. Soil quality, as described in the literature, is a product of academe and any discussion of its origins, prospects and underlying values needs to recognize its institutional setting. Schjønning et al. (2004) seek to promote a more dialogical approach, concurring with Ellert et al. (1997, p. 130) ‘that frank discussions about the values involved in concepts like soil quality may be equally or more important than the technical development and use of indicators to manage ecosystems’. What’s less clear though is how such discussions can be fostered within a traditionally very conservative branch of science that has adhered to a positivist methodology which struggles to admit to the value of a multiplicity of perspectives. I will return to the idea of dialogue and its relationship with health at the end of this chapter.
Sustainability

Discussions of the goals of land and resource management inevitably revolve around the concept of sustainability, although the term has its critics. Newton and Freyfogle (2005) argue that sustainability is vague on the questions of who is doing the sustaining and what is to be sustained. Sustainability lacks meaning as a goal and fails to encompass the ecological understandings and cultural criticisms that have been central to the concerns of many regarding our ongoing relationships with nature and each other. The goal appears to be to persist, without any clear sense of the kind of world we want to persist. Absent is any message of respect; ‘it may or may not’ they write, ‘have a moral element at all’ (ibid., p.25). As a rallying cry they argue, sustainability is simply dull and uninspiring.

While acknowledging the contested and deeply ambiguous nature of sustainability as it is applied to agriculture, Paul Thompson (1995) argues that the concept of sustainability holds the promise of reintegrating philosophy, biology and culture and of ameliorating the tension between environmental and agricultural ethics. Thompson draws on the notion of etic and emic perspectives to identify alternative conceptions of sustainability as either the more-or-less objective system-describing concept as seen by an outsider (etic), or as the goal-prescribing concept belonging to someone on the inside (emic). Thompson concludes that the greater philosophical contribution lies in the system-describing concept as it alerts us to the need to make explicit ‘the philosophical assumptions in our understanding of natural and human systems’ (emphasis in original) (ibid., p. 167). For Thompson what counts is that sustainability may help us to better understand the natural and agricultural systems we rely on by making apparent the complex and normative process of analysing these systems. Of particular importance is making explicit our choices regarding the boundaries of systems and subsystems of interest.81

81 This is a necessarily very brief summary of a dense and detailed set of arguments Thompson makes regarding the concept of sustainable agriculture.
Dahlberg (1991) warns of the danger of the term sustainability being diluted and co-opted by dominant interests\textsuperscript{82}, arguing that sustainability in the context of sustainable agriculture has emerged by default, following numerous critiques that recognize industrial agriculture as being unsustainable. However most models of sustainable agriculture have failed to incorporate many of the concerns these critiques raise, concerns around social justice, land reform, rural development, tax and economic policy and the structure of research, education and extension services. Dahlberg’s fears appear to be confirmed in a widely cited\textsuperscript{83} paper in which Hansen (1996, p. 117) writes that ‘In order for sustainability to be a useful criterion for guiding change in agriculture, its characterization should be literal, system-oriented, quantitative, predictive, stochastic and diagnostic’. There is little recognition here of the conceptual, structural and moral issues that Dahlberg identifies as underlying many of the debates around sustainable or regenerative agriculture. Dahlberg (1994, p. 173) prefers the phrase ‘regenerative food and fibre systems’ believing that it addresses the need for the regeneration of both natural and social systems and is less readily co-opted than sustainable agriculture. Creating regenerative food and fibre systems Dahlberg argues will also require a shift in evaluative criteria from growth and productivity to health.

A key element of sustainability for many is the preservation of resource flows for human usage, an idea ‘lifted’ from resource management thinking of the early to mid 1900s. Ecological footprint accounting encapsulates this idea, preserving the utilitarian relationship between humans and nature that sees humans as ‘the sole moral actors, and manipulating nature based on human knowledge as the proper mode of action’ (Newton & Freyfogle, 2005, p. 26).

At the risk of oversimplifying the arguments, a distinction can be drawn between sustainability being regarded as essentially a technical challenge to be achieved with tools such as ecological footprint accounting, or as a task that requires a significant

\textsuperscript{82} Thompson too points out that competing and incompatible visions of sustainable agriculture are being promoted.

\textsuperscript{83} As a rough guide to the relative influence of these alternative positions regarding the usefulness and meaning of sustainability, Hansen’s 1996 paper \textit{Is agricultural sustainability a useful concept?} has been cited 112 times while Dahlberg’s 1991 paper has been cited 11 times and his 1994 paper 3 times (Web of Science, accessed 24/4/13)
cultural shift. This distinction is broadly consistent with the ongoing debate around weak versus strong sustainability (Ang & Van Passel, 2012; Ayres, van den Bergh, & Gowdy, 2001). Of course it’s not the case that the two ideas are completely incompatible; however the widespread adoption of particular technologies of government, such as accounting, which are consistent with neoliberal or ‘advanced liberal’ approaches to governance, suggest that sustainability is increasingly being framed as a technical and managerial challenge. Newton and Freyfogle’s argument is that health, as expressed by Leopold, has more promise as a goal than sustainability if we are to achieve the kind of cultural change required for better land use in the future.

Waltner-Toews (2004, p. 89) proposes the adoption of health as a ‘supergoal’ that is ‘trans-ideological’, in that it can serve an important role in developing ‘the new cross-cultural symbolic language which ... is necessary to promote convivial and sustainable human life on the planet’. The discursive potential of health is also noted by Gallopín who sees a role for the health paradigm as a crucial element of a new research model for agriculture. Health, he writes, can serve as a conceptual framework representing the underlying foundations of sustainability and productivity ... as a source of diagnostic and curative procedures and tools, and as a focus for integration of research and thinking’ (Gallopín, 1995, p. 139).

Soil quality researchers such as Doran recognize the need for better land management, broadly understood as the challenge of sustainability. The specific contribution of soil quality research to this task is to provide an assessment tool for measuring changes due to management, and as a means of educating farmers and others of the implications of their actions (Doran, 2002; Doran et al., 1996). Leaving aside the question of whether sustainability is a suitable goal for agricultural research, what can we surmise about the values underlying soil quality research and the relationship it proposes between humans and nature, through a look at the metaphors employed?

84 See the discussion of neoliberal political rationality in chapter five.
Ecosystem services

The soil quality literature reveals a particular interest in soil in terms of its function. Schjønning et al. (2004, p. vii) for example begin their preface with the following quote from the USDA Soil Quality Institute: ‘‘Soil quality is how well soil does what we want it to do’’ (italics in original). This functional view of the soil is explicitly described by several authors as the provisioning of ecosystem services (Bone et al., 2010; Doran & Zeiss, 2000; Ellert et al., 1997; Kibblewhite et al., 2008). Bennett, Mele, Annett and Kasel (2010, p. 5) regard ecosystem services as a useful concept to help connect soil health with public benefits through recognition of non-agricultural services, where ‘services are defined as processes that become services if there are humans to benefit from them’.

The concept of ecosystem services springs from the metaphor of nature as a stock of capital, with the maintenance of flows of that capital the aim of environmental management. What began as an ‘eye opening’ metaphor intended to encourage reflection on our destructive relationship with nature has become, Norgaard (2010) argues, a dominant model that blinds us to the complexity of nature and the multiplicity of models for action that are available to us. A similar warning is made by Norton and Noonan (2007, p. 665) who argue that the popularity of ecosystem services locks in a ‘very monistic, utilitarian, and economic vernacular’ that leaves little room for alternative methodologies or ideals, or for a profound reflection on the task of ‘truly’ incorporating both economic and ecological considerations into our decision making. The adoption of the metaphor of the ‘earth as a welfare producing machine’ reflects a choice to highlight certain values and pathways, and to conceal others. ‘It is simply not plausible’ they write, ‘for environmental economists ... to use that hidden metaphor to narrow the ways one can legitimately value, or express one’s value toward nature, and then claim that their measures are “value-free”’ (ibid p. 665). Kosoy and Corbera (2010) draw on Marx’s idea of commodity fetishism to

85 The broad appeal of the concept is well illustrated by Reyers, Roux and O’Farrell (2010, p. 502) who, while expressing certain reservations, invest the ecosystem services concept with the potential for furthering transdisciplinary research and the ‘development of a shared language’ for ecologists and other natural and social scientists.
highlight a number of ‘invisibilities’ in the commodification of ecosystem services. Among their concerns is the way in which the imposition of a monetary exchange-value masks all the other ways in which people value nature. Market price alone can never hope to capture the diversity of values and meanings people attribute to their world. They further argue that the ecosystem services marketplace is characterized by power inequalities that tend to be reproduced rather than addressed, effectively masking important issues of environmental justice.

The popularity of the ecosystem services concept is due in considerable measure to the dominance of the market thinking that gave rise to market environmentalism in the late 1980s. That a certain kind of economic logic has come to pervade ecology so successfully illustrates the principle of coevolution of academic institutions:

> The frameworks of ecology that can be reduced to stock-flow models will no doubt receive more research funding and scholarly attention. These ways of knowing within ecology will likely improve faster than they would have otherwise while other ways of knowing will wane. The enterprise of science has always coevolved with dominant forms of social organization, available technologies, and the range of social values as well as with nature and environmental problems as perceived at the time. (Norgaard, 2010, p. 1222)

Institutional coevolution resonates with Shackley, Wynne and Waterton’s (1996, p. 208) argument that ‘social and scientific knowledge and practices’ are ‘constructed concurrently’ in such a way that they are mutually supporting and reinforcing. This process involves a degree of ‘mutual accommodation’ regarding the nature of the problem and a shared commitment to ‘management and control’. By this analysis the pricing of ecosystem services emerges as a ‘methodological elaboration’ that reinforces an image of the problem as one of internalising externalities; in other words, the problem is amenable to solution through the application of a more refined tool from the same toolbox. The assumptions underlying the methodology remain unexamined because the methodological elaboration acts as a form of ‘institutional blinding’ that inhibits genuine reflexivity (ibid p. 217).  

86 Shackley, Wynne and Wartenton’s arguments are briefly discussed in chapter one.
87 In a similar vein Gaspartos (2010) writes about sustainability evaluation tools (such as ecological footprint accounting, multi-criteria analysis) as what Vatn calls ‘value articulating institutions’; these define
The question is not whether there is a place for tools such as soil health indicators and the various forms of pricing of ecosystem services, but rather what is their place? If better land management requires more than the development of better and sharper techniques; if soil loss is, as Wendell Berry (1977; 1992, p. 14) suggests, ‘ultimately a cultural problem’ to be ‘corrected only by cultural solutions’, there is a danger that the methodologizing tendencies of soil health research might inhibit the institutional reflexivity required to address our ‘environmental crisis’. What hope then is there for the creation of opportunities within institutions for more far reaching examination of the normative assumptions that underlie dominant models of environmental management?

Health, soil, and soil health

The definition of soil health cited above makes explicit the connection with human health although little is made of this link in the literature. Doran et al. (1996) are among the few to address the issue directly and are somewhat dismissive of the claims of William Albrecht (1989), Sir Albert Howard (1972), Lady Eve Balfour (1963) and others - describing them as scientists and farmers ‘of “privilege”’ - that soil condition and farming practices have an important and direct link with human health.88 For soil health and agriculture more broadly to be considered as a branch of the health services, they argue, requires the ‘difficult or impossible task’ of identifying a link by scientific methods (Doran et al., 1996, p. 14). This argument is hardly strengthened by its admission of the shortcomings of scientific practice; it is however consistent with the dominant model of agricultural research that values productivity above all else (Thompson, 1995). Oliver (1997) provides evidence of several cases where soil condition leads to dietary deficiencies and adverse health effects. Keshan disease for

---

88 The argument of Albrecht and others was that industrial agriculture was eroding the capacity of soils to provide nutritionally dense and balanced foods and that such foods played a critical role in human health. Following the ‘dust bowl’ in the 1930s the Friends of the Land campaigned for an ecologically informed agriculture that recognised the importance of soil quality for the production of healthy foods. While the organization disbanded in the 1950s, their efforts to educate the public on the lessons of ecology foreshadowed the growth of grassroots environmentalism in the following decades (Beeman, 1995; see also Forman, 1951). A charter member of the Friends of the Land was Aldo Leopold.
example, is a cardiomyopathy that occurs in children and young women in mountainous parts of China where the soils are deficient in selenium. More widespread are the effects of iodine deficiencies in soils, which occur throughout the world in regions far from the coast. An estimated 1600 million people are at risk of the effects of iodine deficiency which include goitre, cretinism and other mental defects. Oliver highlights the extent of our ignorance on the connections between soil and health and recognizes the difficulties in investigating the effects of subclinical deficiencies and excesses. That Oliver’s call for soil scientists to do more collaborative research in this area appears to have had little impact says more about the practices and priorities of agricultural (and medical) science than it does about the lack of evidence. It is striking too that the connection between soils and health is more readily accepted in relation to (non-human) animal health (see for example Ghafoor, Mahmood, & Qureshi, 2012; Leytem, Dungan, & Moore, 2011; Rodrigues, Pereira, Duarte, & Romkens, 2012; Voisin, 1963).

Berry (1992, p. xvii) makes his point clearly: ‘There is no connection between food and health.’ ‘People’, he adds,

are fed by the food industry, which pays no attention to health, and are healed by the health industry, which pays no attention to food.

vii. It follows that there is no connection between healing and health. Hospitals customarily feed their patients poor-quality, awful-tasting, factory-made expensive food and keep them awake all night with various expensive attentions. There is a connection between money and health. (ibid pp. xvii-xviii)

Those working within the scientific establishment sound a more hopeful note regarding the intersection of health and medicine. Waltner-Toews (1996) for example suggests that medical techniques for screening and diagnosis may be successfully applied to agroecosystems. And Gallopín (1995) draws on the analogy of medical vaccination to suggest that the deliberate introduction of ‘perturbations’ into a managed ecosystem might improve the system’s resilience and health. However it is in

89 The importance of soil as the foundation for the production of healthy foods and the link between farming and human health continues to be highlighted by various practitioners and scientists such as Andersen (1992). A relatively recent paper by Lal (2009) links inadequate human nutrition to soil degradation.
the work of ‘outsiders’ such as Berry that more creative and critical use of is made of the idea of health, and where the disruptive potential of metaphor is more fully realized.

It should be clear from the earlier discussion on the role of metaphor that we can make use of the idea of health in contexts outside of the individual. Criticisms such as those made by Suter II (1993, p. 1533), who argues that ecosystem health ‘implies that ecosystems are super-organisms’, mistakenly demand that metaphors demonstrate ‘truth’ or employ a direct analogy. The discussion that follows is an exploration of the nature of health that draws on the idea of metaphors as tools that both reveal and conceal.

For Berry (1992) the concept of health is inseparable from that of community, where community includes not just the people but also the ‘place’ and all of its living creatures as well. Good health then relies on good relationships between people and places and on a healthy human culture that values ways of living and working that preserve the health of nature. Health implies values of freedom, pleasure and longevity while the aims of production, profit and technological progress imply no social or ecological standards at all. The question of freedom, or rather of autonomy versus dependence, is central to the radical critiques of Ivan Illich (1973, 1976), who linked human suffering to the elision of autonomy by industrial modes of production. For Illich health is a process of adaptation and a task that depends on learning from peers and elders; health is thus situated within culture.

To illustrate the counterproductive effects of medicine on health Illich makes use of the concept of iatrogenesis (from the Greek iatro meaning physician), which he describes as having clinical, social and cultural dimensions. Clinical iatrogenesis occurs when medical interventions result in sickness and death; the side effects of drugs, the breeding of antibiotic resistant bacteria and various forms of accidents and incompetence are among the most visible forms of clinical iatrogenesis. These interventions Illich notes, have also become more numerous and vastly more expensive while promising better diagnosis and treatment. More insidious and profound is social iatrogenesis, which arises ‘when policies reinforce an industrial
organization that generates ill-health’, and cultural iatrogenesis, which is the result of the restriction of people’s ‘vital autonomy’ and capacity to care for themselves and each other, and to respond authentically to pain, impairment and death (Illich, 1976, p. 271). For Illich iatrogenesis is a specific instance of a more general law that applies to industrial modes of production that recognize few limits and which are blind to the ill effects of their operation.

Hodges and Scofield (1983) apply some of the lessons of iatrogenesis in their discussion on ‘agricologic’ or farming-induced disease. Many of the instances of agricologenesis identified by the authors are linked to the use of artificial fertilizers and pesticides, the unintended results of which include an increased susceptibility to disease in both crops and livestock; the development of resistance in weeds and pests; the emergence of secondary pests (organisms that presented no threat to crops prior to the application of pesticides aimed at the primary pest) and various forms of poisoning. More chronic cases of agricologenesis resulting from our position at the end of the agricultural food chain might include ‘so-called “western diseases” ’ such as diabetes and obesity, which are connected to a diet of more refined carbohydrates and less fibre. The causal links proposed here for a range of agricologic diseases are mineral deficiencies, particularly of trace elements, which are the result of fertilizer applications and soil management in general, and the long term consequences of the digestion of pesticide residues. Hodges and Scofield conclude that agricologenesis is more prevalent under ‘conventional’ management wherein maximizing productivity is the primary aim. Compared to ‘alternative’ farming systems, conventionally managed farms are more substantially simplified, more reliant on external and ‘foreign’ interventions, and operate under more stress.

Soil scientists are understandably proud of the part they have played in increasing world food production and see their profession playing a crucial role in the challenge of feeding a growing population with fewer inputs (Janzen et al., 2011). The questions iatrogenic and agricologic diseases raise concern the limits of science and the extent to which the institutionalized practices of medicine and agriculture have become counterproductive. Gomiero, Pimentel and Paoletti (2011) draw our attention to a global food system in which 3.7 billion people are malnourished (including those
suffering from vitamin and mineral deficiencies) and 1.6 billion are overweight while 30 – 40% of food grown is wasted. What role has institutionalized science played in the creation of a food system that Gomiero, Pimentel and Paoletti describe as ‘perverse’?

Iatrogenesis is not a technical failing and thus cannot be remedied by the application of more and better technology. Such is the logic of institutionalized medicine and agriculture however that the application of more of the same is indeed the common recourse, carrying with it the threat of further entrenching iatrogenesis. It represents in essence, ‘the political misuse of scientific achievement to strengthen industrial rather than personal growth’ (Illich, 1976, p. 9). The recovery of health can only be achieved by a political program that supports our autonomous powers for health care, our capacity to adapt to others and to nature. Illich identifies a number of obstacles to the recovery of health, two of which I will briefly discuss here. The first of these is the ‘demythologization of science’; science as an ‘institutional enterprise’ Illich argues, has led to ‘a paralysis of the moral and political imagination’ (ibid pp. 85-86). Not only have we enshrined a notion of health that is dependent on a particular type of knowledge, we have also become dependent on others to produce this knowledge for us. This notion of health as the product of specialist knowledge fosters a declining interest in healthy behaviours and environments. As knowledge consumers we fail to exercise our own judgement and decision making capacities and fail to realize our potential as moral and political actors, and as creators of the social orders we live in (Shotter, 1993).

Gadamer (1996, p. 7) too calls for the demythologization of science, a task for science itself to counter the ‘superstitious faith ... which strengthens the technocratic unscrupulousness with which technical know-how spreads without restraint’. Gadamer’s analysis is more broadly concerned with the tension between theoretical knowledge and practical application that can be traced back to the Greeks and the development of modern science in the seventeenth century. The problem arises in the specific instance where that knowledge has to be applied, for this is a task that
requires the exercise of judgement. As science, like many other aspects of modern life is institutionalized as a business, accommodation to such rational forms of organization takes place at the cost of the proper practice of judgement. As opportunities for the expression of autonomy are eclipsed, for example in the increasing regulation of traffic, the more we ‘unlearn’ how to make such decisions for ourselves. Here Gadamer too sees the danger of the loss of freedom through our dependence on others, on specialists, to provide information and to pass judgement on each other. The ‘unavoidable consequence’ he concludes, ‘is that science is invoked far beyond the limits of its real competence’ (ibid p.8).

Competing demands on science and the limitations of technical expertise have contributed to what Schön (1995b) characterizes as a ‘professional crisis’. Situations in which we find conflicts of values or problems which have arisen from the application of prior solutions for example, require skills outside the purview of professional expertise. The practices of potentially useful skills like intuition or artfulness are meanwhile regarded with suspicion within the rational forms of organization institutionalized in scientific practice. The art of healing, understood not as the act of making or producing anything but as enabling the restoration of equilibrium, sits a little uncomfortably within modern natural science that is concerned with ‘projective construction’, with the creation of predictable effects. In spite of the technical refinement of medical science healing remains connected to the restoration of that which belongs to nature, to the art of withdrawing from intervention and setting the patient free. ‘Medicine’ Gadamer (1996, p. 39) writes, ‘represents a peculiar kind of practical science for which modern thought no longer possesses an adequate concept’.

---

90 A concern with judgment arises for the scholar too in how to apply his or her references in the service of an argument or a position. How does one give sufficient credit or recognition to the context of the source, to what may be, as in the case of Gadamer’s essays, a handful of points among a much larger and more complex discussion? How to moderate the instincts of the magpie: the fetishism for references without committing an injustice?

91 One of the most well known examples of medical care that recognizes the capacity of the patient to heal themselves is the use of placebos. More recent examples involve the exploitation of neuroplasticity, which enable patients to make remarkable recoveries from what would have previously been considered catastrophic and irredeemable brain injuries (Doidge, 2010).
The second obstacle Illich raises concerns language, and in particular the shift from verb to noun that re-imagines learning as education, and the act of being well as health. Education and health have become possessions, commodities made by others for our consumption. This relationship is powerfully configured in English while largely absent from some other languages. The idea of health as a purchase represents for Illich (1976, p. 89) an ‘industrial corruption of language’ and ‘an impoverishment of the social imagination’. That a particular relationship to health is so strongly encoded in our language makes the task of its re-creation that much more difficult.

Finally I want to return to the topic of dialogue or conversation and its relationship with health. Engaging in genuine dialogue appears to be both a means and an end for good health. It is not only central to the art of healing but an expression of freedom and identity. It is the foundation of our social world: as Beattie (cited by Mühlhäusler & Harré, 1990, p. 21) writes, we ‘find a mate with it, are socialized through it, rise in the social hierarchy as a result of it, and, it’s suggested, may even develop mental illnesses because of it’.

For Gadamer (1996, p. 128) the dialogue between patient and doctor is an important part ‘of the treatment itself’. It is at the same time central to uncovering some of the hidden nature of health, to discerning that which is not accessible to examination by scientific method. It is through dialogue that the doctor might gauge at any point what interventions are appropriate; and it is through dialogue that the conditions might be met for all parties to learn that which they need to learn for themselves. Steslow (2010) highlights the importance for the psychiatric patient of being heard in their own words, in light of the tendency for the clinician to develop a diagnosis and a narrative that is institutionally determined and which leaves little room for alternative characterizations and treatments. Reflecting on her own experience as a psychiatric

---

92 Interestingly Illich does not offer a particular verb to stand in relationship to health, as for example, learning stands in relationship to education.

93 ‘Genuine dialogue’, Gadamer (1996, p. 137) writes, ‘is concerned with creating opportunity for the other to awaken his or her own inner activity’. This is consistent with Maturana’s concept of autopoiesis and his observation that we are ‘informationally closed’. Learning is an internal process that may be ‘triggered’ through engagement with another; it is not a process analogous to the transfer of information (Russell & Ison, 2004).
patient, Steslow asks that room is made for ‘the idiosyncratic metaphors produced by
the individual imagination, which offer just as much possibility of therapeutic effect as
those more familiar to us’ (ibid., p. 31).

**Concluding remarks**

What I have sought to do here, making use of metaphor and other aspects of
language, is to sketch some of what is possible under the banner of health. My
intention is make a case for the idea of *health* as a resource: as a rich source of ideas
concerned with language, practice and values with the potential to generate
conversation and action around our relationships with nature and each other. The
challenges we face in food production and land management are considerable and will
require a diversity of models and practices with which to address them. My concern
lies not with soil health research *per se* but rather with the threat that any particular
interpretation of it should become so entrenched that all sense of health as a living
metaphor is lost. Better land management, or should I suggest, more healthful and
healing relationships, will require as much or more of our imaginations and
responsibilities as it will our technical abilities and capacities for reasoning.
Conclusions

Farmers and farming communities in Australia are under considerable pressure to meet public expectations of them as land managers whilst maintaining viable businesses in the face of an ongoing cost-price squeeze, a high Australian dollar, dry soils and clear skies. In much of south-west Western Australia, one of the nation’s major grain growing regions and the location of my research, rainfall has declined significantly since at least the mid 1970s (Silberstein et al., 2012). At the time of writing, state and federal governments are announcing assistance packages for farmers to address what appears to be a growing crisis within farming communities across the country (Neales, 2013). Current circumstances should be also seen against the long term shift in wealth within the agricultural industry away from farmers and concern that it is rural Australia that will face the greater impact of climate change (Alston & Whittenbury, 2011).

I began this research motivated by an interest in the future of farming, rural landscapes and communities, hoping to assist farmers to better understand and monitor their soils. As I came to understand the way in which the framing of ‘problems’ reflected the perspective of the researcher and the traditions which they work within, I felt that I should approach the situation from a position of ‘ignorance’ with a willingness to learn. What I, and we, learned together could not be described as neat conclusions of generalized knowledge. We sought to create useful and contextual knowledge that might enable collective action to improve upon an aspect of their lives as farmers in the Gairdner district. As a critical action researcher I was seeking to position my co-researchers as active constructors of knowledge and meaning that both ‘increases their ability to control their own situation’ while bridging local and scientific knowledge (Greenwood & Levin, 2007, p. 107). To facilitate this process I engaged in a network of ‘conversations’ not only with my co-researchers but with relevant bodies of knowledge. Fundamental to maintaining these conversations were an awareness of my responsibilities as the principal researcher and the importance of paying attention to the quality of the relationships I had initiated.
Despite initially framing my research interest in terms of soil health, given the opportunity to describe their own concerns my co-researchers expressed a strong interest in their communities as not simply places in which the physical environment is cared for but one in which social aspects are paramount. Together we created some of the social context within which narrower biophysical and economic descriptions of ‘problems’ are set. These descriptions are maintained and reproduced through institutionalized ways of knowing that privilege instrumental reasoning and the ability to ‘transfer’ to passive recipients the knowledge created. My co-researchers are engaged in a range of relationships with organizations and institutions that regard rural communities as being made of up so many economically rational actors, working within essentially bio-physical landscapes. Within these particular constructions the nature of the relationships between actors tends to be tightly constrained, reproducing and reflecting inequalities in status and power. These institutionalized identities and ways of knowing are challenged by my co-researchers. Graeme for example regards himself as a contributor to public health, while Stuart sees himself as a restorer of landscapes, not because it will reap any financial benefit but because it makes him feel good. And the value attached to scientific knowing and knowledge are rendered problematic in the way Gareth and Tony describe their own ways of knowing and the consequences of adopting recommended technologies. Institutionalized approaches to agriculture and NRM will continue to meet with resistance so long as farmers’ own perspectives and understandings are regarded as less accurate and less valuable than those derived from dominant traditions.

Ison et al. (2011) argue that conventional standardized approaches to environmental and natural resource management have frequently failed as a result, in part at least, of a failure to understand context and a lack of awareness of the ways in which institutionalized approaches frame knowledge and knowing. Many ‘researchers/scientists and policy makers’, they write, ‘lack a reflexive understanding of their own practice and the rationalities (or epistemologies) out of which they think and act’ (ibid., p. 3985). They call instead for a methodological pluralism and the application of ‘disruptive’ modalities and ‘clumsy solutions’ (Ingram cited in ibid., p. 3978) that might prompt new conversations, understandings and awareness which
lead to the ‘generation of performances fit for circumstances’ (ibid., p. 3984, see also Woodhill, 2002). While we may have failed to enact any meaningful action as a result of our work together I believe that we shared in creating a space for dialogue in which people felt free to express themselves. Creating such spaces for dialogue wherein people feel able to disagree and to express ignorance, anxiety and frustration and where there is no coercion or judgement, seems especially valuable given the narrow framing of most rural ‘problems’ and the limited opportunities for social engagement in farming communities that are growing smaller and more ‘business-like’.

Action research is not solely concerned with creating useful knowledge but is as much an inquiry into the researcher’s practice. Reflecting on and writing about my practice as an action researcher is made more difficult by the fact that this practice involves what Schön (1995a, p. 29) describes as ‘a pattern of tacit knowing-in-action’. The action researcher requires a variety of skills which differ with the adoptations of various ‘positions’ as observer, participant-researcher and co-researcher, with the intention to build coherence and to disrupt, to combine the analytical with the playful and ironic. Skills of artfulness, judgement and intuition are difficult to describe and best understood in action.

What has been clear to me is the way that perspective and reflection can continually re-shape a project, revealing new connections and new questions. As I read and re-read papers, notes and transcripts new interests and openings emerged, phrases and words that triggered little response at first assume new significance on re-reading. In the same way that my ‘window on the world’ is reframed as I shift from preoccupation to preoccupation, revealing just how ephemeral and fluid the researcher’s perspective can be. As I have already made clear the ‘system of interest’ in my research underwent a significant change in response to changes in my window on the world. While still engaged with the same group of people whose situation had not apparently changed, a change in my perspective radically altered what I considered to be important. My analysis of the data we created was also subject to the vagaries of

---

94 At various stages of this project when I have been particularly interested in an idea I have ‘made’ connections with snippets of radio programs, newspaper articles, news stories and conversations. The capacity to create connections and deem ideas to be relevant seems almost endless.
perspective. While the overall thrust of my analysis was shaped by my intentions to both stimulate conversation and to take action, my reading of the interview transcripts were susceptible to continual re-interpretation as repeated readings and multiple voices made conclusions and distinctions always provisional. Over the course of my research then, my view of the world, or of this particular part of the world, has both shaped and been shaped by my interaction with my co-researchers and with various bodies of knowledge. Yet despite the obviously fundamental role that a researcher’s perspective plays in the nature and focus of his or her research, it seems that most agricultural researchers pay little attention to it. I have tried in this thesis to make apparent the ways in which my assumptions and beliefs have shifted and have shaped my work and to take responsibility for this.

It is equally clear to me that undertaking this sort of research is a daunting task and best suited to a team of researchers. The multiplicity of tasks and perspectives required to thoroughly apply the methodologies described in chapter three seem beyond the individual researcher, especially for the inexperienced. The tendency to return to favoured ways of knowing so that they become entrenched means that it becomes more difficult to break out of these patterns and to ‘seek out and master new techniques that help us to diverge/assimilate/converge and/or accommodate in better ways’ (Bawden, 1991, p. 15). Working within a team it seems to me, better enables the researcher to see their understandings through another’s eyes.

Kemmis (2008, p. 126) argues that in researching into one’s own practice the self must be understood as constructed, as a ‘situated and located self’ with a particular ‘cultural-discursive history’. In the interests of the values of democracy and empowerment I have sought in this project to enable my co-researchers to express themselves and to generate their own understandings and meanings without undue influence on my part. However, as I have already pointed out, this project was instigated at my behest and throughout out time together I have had to keep an eye on what I required to achieve out of it. I have juggled responsibilities to my co-researchers and to myself and the university with my ‘constructed self’ my most frequent guide. The question of how to reflect on my role and influence as principal researcher with the aim of not only improving my practice, but of ‘improving the
understanding of the practice’ (Bawden, 1991, p. 27) remains very much open. Habermas writes of the difficulties and dangers:

The self-reflection of a lone subject ... requires a quite paradoxical achievement: one part of the self must be split off from the other part in such a manner that the subject can be in a position to render aid to itself. ...

[Furthermore], in the act of self-reflection the subject can deceive itself. (cited in Kemmis, 2008, p. 127)

I can recall my frustration at what appeared to me as a lack of reflection on the part of one of my co-researchers in response to my questions regarding the model of our interview. I had to quickly upbraid myself however by recalling the difficulty I had in reflecting on my own understandings. There appears to be little substitute for continually practising reflection in the hope that it might come more easily. I am also well aware of the benefits to be had in setting up ‘communicative spaces’ in which the researcher might make use of others to improve practice and the understanding of practice. While I’m confident that my practice and the understanding of my practice have improved as a result of this project, I’m less confident of being able to say exactly how.
References


191
Managing soil quality: challenges in modern agriculture.
Wallingford, UK: CAB International.


Change, November/December, 27-34.

Aldershot, UK: Arena.

Shackley, S., Wynne, B., & Waterton, C. (1996). Imagine complexity - the past,
present and future potential of complex thinking.
Futures, 28(3), 201-225.

London: Routledge.


Journal of Hydrology, 475, 441-455.

government policy for the future of voluntary Landcare groups in Western Australia.
Australian Geographer, 41(3), 403-423.

Wheaton IS: Quest Books.

presented at the Joint Economic Committee symposium - Agricultural
industrialization and family farms: the role of federal policy, Washington D C.

South Coast Regional Initiative Planning Team (SCRIPT). (2005a).
Albany, WA: South Coast Regional Initiative Planning Team.

South Coast Regional Initiative Planning Team (SCRIPT). (2005b).
Appendix nine, consultation process. Albany: South Coast Regional Initiative Planning Team.

South Coast Regional Initiative Planning Team (SCRIPT). (2005c).
Appendix nine, final comments. Albany, WA: South Coast Regional Initiative Planning Team.

2011: Independent report to the Australian Government Minister for Sustainability,
Environment, Water, Population and Communities. Canberra: DSEWPaC.

The Hastings Center Report, 40(4), 30-33.


Environmental Toxicology and Chemistry, 12, 1533-1539.


Appendices

Appendix 1: Study site

The farmers who participated in this project all live and work within the catchment of the Bremer River, in the Gairdner district. The Bremer River catchment provided a suitable study site for a variety of reasons, among which was the location of an ECU research station in the town of Bremer Bay. While the station was rarely used it seemed that my project could build on the presence the university had established in the area, while providing me with a suitable work and living space. In addition I would be working in a designated ‘strategic catchment’ which may have provided opportunities for funding or other forms of support. The prospect of conducting my fieldwork in an area of such natural beauty was also an added attraction.

The small town of Bremer Bay on the south coast of Western Australia, approximately 180 kilometres east of Albany, is located on the Wellstead estuary where the Bremer River meets the Southern Ocean. Named after the pioneering pastoralist John Wellstead, the estuary, like many river mouths along the coast, is only open to the ocean following sufficient rainfall higher up in the catchment and may remain closed for several years. Bremer Bay is a popular tourist destination particularly in the spring and summer, providing a variety of beaches and spectacular coastal scenery while acting as a gateway to the Fitzgerald River National Park. Not surprisingly tourism is a significant source of income and employment for the town while additional economic activity is generated by the abalone farm, a small fishing industry, and farming related enterprises like shearing and chemical supplies.

In the last few years Bremer Bay has experienced something of a real estate boom, much of it apparently driven by speculators from the eastern states keen to buy property with ocean views. Extravagant development schemes are occasionally proposed, including the construction of a bridge across the river to link an isolated block of private land to the town and. To the east of the town, across the Bremer River, lies the National Park. Limited access through the Park means that Bremer Bay
lies at the end of the sealed road that runs close to the coast for much of the southern part of the state.

The Fitzgerald River National Park comprises hectares of a variety of landscapes and is an area of extraordinary biodiversity that makes the park a site of international significance. There are almost 1800 plant species in the park, 75 of which are endemic. The diversity of habitats provides for 184 species of birds and 20 species of mammals, more than are found in any other conservation reserve in the south west of Western Australia (Thomas, 1989). Unfortunately the park faces ongoing threats in the form of dieback (Phytophthora cinnamomi) and development pressures.

The Bremer River catchment is relatively small in size at about 716 km², with the river extending no more than 70 kilometres inland (roughly north) from Bremer Bay. A total of 57 farms are located within, or partially within the catchment, while about 35-40 farms account for the vast majority of the cleared area, which comprises some 80% of the catchment. Rainfall in the catchment occurs mainly in winter and declines quite rapidly with distance from the ocean; the mean annual rainfall on the coast is 600 mm while at the top of the catchment it is down to 450 mm (Heller, 1996).

In geological terms the upper catchment consists of the Archaean Yilgarn Block, exhibiting duplex sand-plain soils with some lateritic gravel overlying dense mottled clays. The lower reaches consist of Tertiary marine sediments (mostly sponges) of the Plantagenet Group, Pallinup siltstone, otherwise known as spongolite. Here the soils are finer textured than those in the upper catchment (ibid.).

The Bremer River catchment is a mixed farming zone with wheat, barley and canola comprising most of the cropping, while sheep are grazed throughout most of the catchment with some cattle run closer to the coast. Cultivation techniques are predominantly minimum or zero tillage.

Among the major soil related concerns for the region are subsurface acidity, water repellence and salinity, although this analysis is based on potential risks and not on actual soil condition, owing to the lack of sufficient data.
The area was one of the last in the state to undergo widespread clearing for the creation of new farms with much of the area developed under the War Service Land Settlement Scheme. Clearing took place at a rapid pace with more than 100,000 hectares cleared, fenced and sown to crop or pasture between 1955 and the early 1960s. Land was still being cleared for farming in the Gairdner district in the early 1970s.


Appendix 2: Models from interviews

Figure A2.1: Model created from interview with Graeme
Figure A2.2: Model created from interview with Juliette
Figure A2.3: Model created from interview with Kate

"I am sort of quite proud that our landscape and our trees, our vegetation, is actually still in a very healthy state."

"...I like the look of the farm. I like to see it looking healthy and well cared for."

"... do the right thing by the world."

"... until we're all thinking out of the same think tank, that might always be a problem."

"Got a neighbour... he's quite prepared to sacrifice one farm, to ensure... he gets the maximum production."

"... if we had a better system than spraying... than just burning... rapid fire. I'd like to see it."

"I don't like to but I know it has to be done."

"... less than a third of children from rural backgrounds come back to the country."

"Some of those dust storms... brought about big changes and big learning curves."

"Some of them... just storms."

"I think we're here for the long run and... we're doing it well enough to be able to stay."

"optimism & potential"
Figure A2.4: Model created from interview with Stuart
Figure A2.5: Model created from interview Tony
Figure A2.6: Model created from interview with Trish