

Adapting to climate change: A view from the ground

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‘Asked why he hadn’t taken to agriculture a Bushman replied, “why should we plant, when there are so many mongongo nuts in the world?”’ Waller, 1971.

Introduction

We are, unmistakably, in an era of rapid change and transformation. There is no clearer indication of this than through the magnitude and momentum of international research effort, international policy focus and increasing local interest and action with the issue of climate change. For at least the last fifteen years the climate change science community has strongly focused on engaging with the international policy community. Yet, despite the considerable, and on-going, science-policy dialogue there is still an ‘apparently perpetual state of gridlock on climate change policy’ (Robinson et al., 2006). In seeking to address this gridlock there are a growing number of scientists arguing for a shift in focus towards a more integrated approach to research and policy that encompasses adaptation and mitigation within a broader sustainable development context (Bizikova and Cohen, 2006, Bizikova et al., 2006, IPCC, 2005, Robinson et al., 2006, Swart et al., 2003, Tompkins and Adger, 2003).

Integral to this interlinking of climate change responses and sustainable development is greater engagement of the science community with local stakeholders in forming new partnerships towards development of ‘the business plans, policies and visions required to implement sustainable urban strategies’ (Robinson et al. 2006). Robinson et al. (2006) identified the critical role that the private sector played in British Columbia in championing a sustainable development framework for addressing climate change along with other issues. These new forms of partnership are identified as part of a two pronged strategy that also involves development of new forms of engaging the public and interested stakeholders.

Implicit in this approach is a growing recognition that when we scale from the global to the local there is a shift from the biophysical and earth physiology dimension (see for example Lovelock, 1986) to the dimension of human psychology and behaviour. At the local scale the modelling of physical and biological changes becomes more complex, costly and rife with uncertainty. The human element comes into play much more at the local scale and cannot be simply characterised through computer models (for example). The need for improving understanding of linkages between macroscale and microscale phenomena and processes was identified by Wilbanks and Kates (1999) as ‘one of the great overarching intellectual challenges of our age in a wide range of sciences’. At the core of this is a mismatch ‘between the knowledge that is needed to act locally and what is currently being done globally to generate knowledge about climate change, its impacts, and responses to concerns’ (Wilbanks and Kates, 1999). Increasingly this is being acknowledged as a problem of culture clashes, issues of identify, and simply different (but equally) valid understandings of the problem (Sarah Burch, pers comm.; see especially Wynne (1992)).

This mismatch is exemplified here through lessons learned from a decade of research in climate impact and adaptation assessment. Throughout this research there were on-going barriers in effectively communicating relevant information to local people and agencies. For example, a New Zealand climate change research programme (Kenny et al., 2000, Warrick et al., 1996, Warrick et al. 2001), which was aimed at improving local capacity and decision-

making, resulted in limited uptake by Regional Councils, one of the principal target audiences of the research effort.

The above experience led to a ‘learning by doing’ approach to engaging with farmers in eastern regions of New Zealand (Kenny and Fisher, 2003, Kenny, 2005). In working with farmers the author also developed a partnership with an artist. The combined experience of down-to-earth farmer wisdom and being challenged to create an effective art/science dialogue resulted in deeper insight to the whole issue of climate change. It has become evident that there is much to learn through the wisdom of people who live and work on the land, particularly those who are proactive and visionary in implementing change. The fundamental importance of agriculture and developing a land-based perspective was clearly recognised by Bookchin (1976) ... *‘We must begin with the land if only because the basic materials for life are acquired from the land. This is not only an ecological truth, but a social one as well.’* At the same time much has been learnt through working with an artist. What began as a process of seeking to educate farmers became, as much if not more, a process of a biophysical scientist being re-educated by farmers and his artist friend/colleague. Out of this re-education process emerged a confirmation of the thinking and insight of others in the research community, as outlined in part above, and a deepened understanding of climate change as a behavioural and psychological issue.

It has become clear that, irrespective of the international policy gridlock, what increasingly matters is how to open people’s minds and imaginations to the reality of climate change (see McKibben, 2005). Effective change more often than not comes at the local level through a combination of individual action and collective interactions. Unfortunately the science and policy communities are not always as aware of local, often undocumented or informally documented, activities as they could be. Thus, it is argued here that we don’t just need to shift the lens to a sustainable development focus (Bizikova et al., 2006, Robinson, 2005, Robinson et al., 2006). We also need to shift our position to get a different perspective on things, in particular to get a much clearer view from the ground. The following is one such perspective.

What is adaptation?

Adaptation is defined by the IPCC (see Annex B, Glossary of Terms, McCarthy et al., 2001) as: *‘Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.’*

Adaptation is considered, along with mitigation, to be a crucial response to climate change. However there have been disagreements about the relative focus on adaptation and mitigation, with the latter prevailing in terms of international and national policy responses and research effort over the last decade (see Chapter 1, McCarthy et al., 2001). This stronger emphasis on mitigation is still widely prevalent and is motivated by the view that we need to focus our resources on limiting the extent of global warming. However, it has long been argued, from the earliest impacts assessment work (see Parry and Carter, 1989, IPCC, 1990) that some level of climate change would be inevitable and that adaptation would be a necessity. In the words of Parry and Carter (1989) *‘it is probably unwise... to adopt a wait and see attitude... the longer we delay in acting [to reduce emissions] the greater we will have to adapt in the future’.*

A decade of impacts and adaptation assessment

In early climate change research consideration of adaptation was embedded within a stepwise hierarchical framework involving: scenarios of climate change, identification of impacts, and consideration of adaptation options. This stepwise approach to impact and adaptation assessment was formalised through the work of Carter et al. (1994), Parry and Carter (1998) and Feenstra et al. (1998).

The hierarchical approach to impact and adaptation assessment evolved out of early studies on climate change impacts, many of which were focused on agriculture (see for example Parry and Carter, 1989, Carter et al. 1991a, 1991b, 1992; Kenny and Harrison 1992a, 1992b; Kenny et al., 1993). Within these studies adaptation was largely considered as adjustments to farm management, farm infrastructure, strategic research, agricultural policy. Adaptation was, for the most part, seen as a scientific, technological and policy oriented process. Key research questions that emerged through this work revolved around how to address the issue of uncertainty in the science of climate change, in the extent of future climate change, and in scaling from global to regional and local scales. Within New Zealand the CLIMPACTS project evolved out of early impacts research. It sought to provide an integrated framework for addressing the uncertainty questions and to provide a basis for national, regional and local adaptation responses (Kenny et al., 2000, Warrick et al., 1996, Warrick et al. 2001). As this work matured there was an increased focus on changes that might be critical in terms of the type and level of response that might be required (Kenny et al., 2000). While very valuable the experience with this work, in particular the relatively poor uptake by affected industry groups and Regional Councils, has mirrored emergent thinking through the IPCC that the hierarchical approach to impacts and adaptation assessment is limited.

Adaptation and mitigation – two sides of the same coin or separate currencies?

The concept of response capacity, representing the confluence of both adaptive and mitigative capacity, has been developing some momentum over the last few years (Bizikova et al. 2006 and Tompkins and Adger, 2003). The first IPCC assessment provided a foundation for such an approach through the ‘The IPCC Response Strategies’ publication of Working Group III (IPCC, 1990). However there was a subsequent divergence of adaptation and mitigation research efforts, as reflected in the second and third IPCC assessments.

The growing focus on mitigation in the second assessment report was clearly directed at informing national and international policy-makers, leading to the negotiation of the Kyoto protocol in December 1997. In parallel with this effort a sensitivity/vulnerability assessment approach emerged, driven by growing evidence that there would be clear winners and losers, with developing countries bearing the brunt of the problem (Rosenzweig and Parry, 1994). Clarification of areas of greatest vulnerability was needed, in part, to strengthen the case for net emitters of greenhouse gases to take greater responsibility in mitigating the worst effects of climate change. This combined sensitivity/vulnerability and mitigation/international policy approach was reinforced by Parry et al. (1996) in seeking to identify what was meant by ‘dangerous anthropogenic interference with the climate system’ and how science could further contribute to enabling policy judgements and actions in this regard.

While such international effort has been very important the consequence has been a tendency to amplify the separation between adaptation and mitigation. An outcome of this divergence, in New Zealand and elsewhere, has been the development and implementation of national communication strategies and efforts at public engagement that have been focused wholly on mitigation. Within the past two years the situation has started changing, with growing interest

in adaptation. The new challenge is how to create understanding in local communities that climate change will require both adaptation and mitigation responses and that these need not be mutually exclusive.

It is unfortunate that we have created a much greater challenge for ourselves in this regard than necessary. As far back as the first IPCC assessment (IPCC, 1990) the case for adaptation was clearly presented, the principal arguments being:

- 1) The time lag between emissions and subsequent climate change, meaning that even if emissions are stabilised or reduced change will happen into the future.
- 2) Natural climate variability itself necessitates adaptation.

Further, the importance of a balanced approach encompassing mitigation and adaptation was recognised ... 'should significant adverse climate change occur, it would be necessary to consider limitation and adaptation strategies as part of an integrated package in which policies adopted in the two areas complement each other so as to minimize costs' (IPCC, 1990). The need for consideration of potential synergies between adaptation and mitigation was not wholly lost over following decade, with Schneider et al. (2001) identifying the importance of an integrated and balanced response to climate variability and change. However, at the same time, the separate treatment of adaptation and mitigation has continued to be reinforced, as shown in the schematic from Smit et al. (1999) and presented as Figure 1-2 in Schneider et al. (2001).

In the current IPCC assessment there is a stronger, renewed, call for a much more integrated approach to adaptation and mitigation (IPCC, 2005). This reflects the reality, as signalled in the first IPCC assessment, that significant climate change is now occurring and serious consideration needs to be given to identifying co-benefits from adaptation and mitigation.

For these co-benefits to be both recognised and realised there is a need to focus a lot more on people and communities and to put climate change into the context of the multiple issues that they are dealing with. This is the main thrust of the Adaptation Mitigation Sustainable Development (AMSD) approach that is being advocated by Robinson et al. (2006). They argue that simultaneous consideration of adaptation and mitigation, within a sustainable development context, allows for examination of response capacity and development of effective response strategies. This needs to happen within a broader decision-making context that takes advantage of synergies, avoids unnecessary duplication of resources, and maximises long-term benefits in terms of development choices that lead to a more sustainable development path. The logic of such an approach is undeniable, and its strength is derived from a realistic view of how people and communities work.

Identifying the weak links

A reinterpretation of the Smit et al. (1999) schematic identifies the process that has evolved over the last 20 years and is still the predominant focus of the science and policy communities (Figure 1). At its core, climate change developed as a scientific issue, as it has been since the late 1970s. There is now a considerable body of scientific evidence and the development of this is on-going. The science-policy dialogue developed through the 1990s with a current level of international and national policy effort that is increasingly reflecting the scientific evidence. Scientific understanding of potential societal responses is reasonably strong with increased involvement of social scientists in climate change research over the last decade. A lot of policy work has been undertaken to stimulate mitigation responses, particularly by signatories to the Kyoto protocol, but this effort is not being reflected in effective actions to

minimise or reduce emissions. The weakest links relate to adaptation responses, effective communication of the science to society in ways that are engaging people towards acting on climate change, and implementation by society of effective mitigation and adaptation responses.

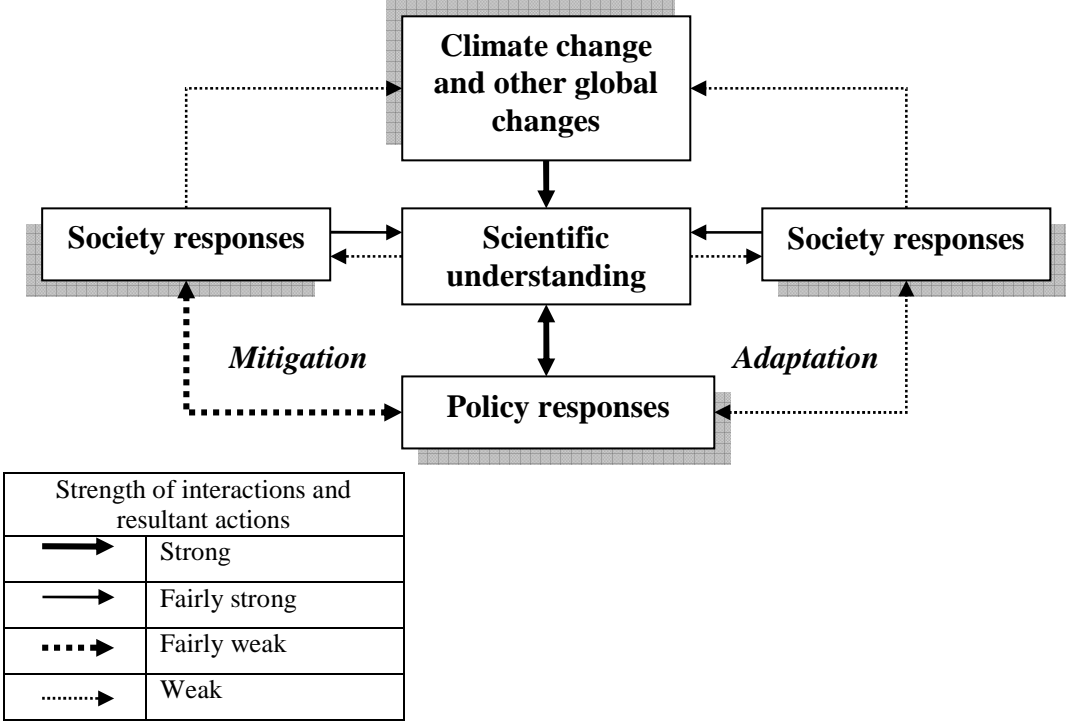


Figure 1: Identifying the weak links in addressing climate change

The weakest links (Figure 1) are the ones that matter the most in seriously addressing climate change, not as a science or policy issue, but as an issue that some now see as a question of survival (eg, Lovelock, 2006). As already suggested there is a need to do more than just shift the policy dialogue to a sustainable development focus. There is a need for a serious focus on how the whole of humanity can effectively respond to climate change and, importantly, the on-going role of the science and policy communities in helping guide this. The crucial missing ingredient is people and the communities in which they live and respond to multiple stimuli and changes. At the level of individuals and community there is a much more integrated view of things, particularly when translated to local actions. The key is finding effective ways to bridge between the science and policy worlds to the daily lives of people. This is not easy work and is the biggest challenge by far for scientists, policy-makers, and anyone else who is informed enough to be seriously concerned about climate change.

The missing ingredient – people

The scenario-led, hierarchical, approach to impact and adaptation assessment was founded on a belief that quantification of impacts was necessary to formulate effective responses, both in terms of adaptation and mitigation. There are two major, interlinked, limitations to this approach:

- 1) The challenge of scale
- 2) The challenge of engaging people and communities

The CLIMPACTS research (Kenny et al., 2000, 2001) sought to address the scale issue in New Zealand and subsequently in other places, including Bangladesh and the Pacific Islands (Warrick et al., 1996, 1999). It was relatively successful in scaling from the global to national and regional (within country) scales. However, it was limited by the availability of relevant and reliable predictive models to quantify effects, the challenge of communicating uncertainty, and in terms of compatibility with existing decision-making processes at the regional and local levels. This work was ultimately limited by the challenge of engaging people. The challenge of engaging people with climate change has been experienced by the author in a number of ways, including:

- 1) An encounter with a local farmer while working at the Environmental Change Unit (now Institute) at the University of Oxford in the early 1990s and a failure to bridge scale and communication divides.
- 2) Experiences in Bangladesh, in particular an encounter with char¹ people which highlighted the huge divide between attempts to quantify impacts of climate change (Warrick et al., 1996) and the reality of highly resilient people living in very vulnerable environments.
- 3) Lessons from the Pacific Island Climate Change Assistance Programme (PICCAP), which highlighted a need to connect climate change with other local issues, identify relevant work already happening (within a wider sustainability context), and the importance of developing a grassroots approach that acknowledges multiple interactions and interdependencies, as against a prescribed sectoral approach.
- 4) Involvement in a development assistance project in northern Viet Nam (May and Kenny, 2000) that provided experiences and lessons in participatory approaches to engage community and the importance of identifying and working with innovators (Mao, 1998).
- 5) Experience in developing and seeking to transfer regional versions of the CLIMPACTS software to two Regional Councils in New Zealand (Environment Waikato and Environment Canterbury), which proved to be ineffectual because the software wasn't compatible with existing decision tools and processes, the uncertainty capability created confusion, there was insufficient consultation in its development, and not enough consideration was given to existing capacity and needs to proactively address climate change.

In response to lessons learned from the PICCAP work Warrick (2000) suggested that adaptation needs to be viewed more broadly as a process which is ultimately aimed at implementation. Successful implementation is considered to involve five major pre-conditions (Warrick, 2000; Ministry for the Environment, 2002): provision of knowledge, data and tools; risk assessment; mainstreaming; evaluation and monitoring; awareness raising and capacity building. This remains a theoretical framework (Warrick, pers. comm.) although experience from recent work with Environment Bay of Plenty (Kenny, 2006) suggests that some elements of this framework do come into play in practice.

In contrast to the theoretical approach presented by Warrick (2000) a 'learning by doing' approach was adopted by Kenny (2005). This was founded on a decade of experience with the hierarchical approach to impact and adaptation assessment along with lessons and experiences described above. This decade of work highlighted the dual challenges of working

¹ Char land refers to flood affected land in Bangladesh, either islands or swathes of land along unprotected river margins, that is frequently eroded and re-deposited during major flood events

at regional and local scales and engaging with people on the ground. It became increasingly evident that attempts to quantify impacts and associated uncertainties at more local scales was resource intensive and had limited uptake. While impact assessments using available data, tools and expertise can still yield valuable information they shouldn't be seen as a prerequisite for development of proactive adaptation measures.

The 'learning by doing' approach adopted by Kenny (2005) was to draw on available scientific knowledge, but to largely step around the impact assessment approach and work on a proactive adaptation approach aimed at building resilience for an uncertain future with climate change. The focus shifted towards developing an understanding of what was required to bridge the communication divide and begin to address the weak links identified in Figure 1. Through taking such an approach it has become clear that engaging people in dialogue about proactive adaptation provides a window through which multiple issues and challenges can be addressed. This window opens to a much more integrated picture.

Engagement with farmers in eastern New Zealand

In the latter part of 2001 the Ministry for the Environment and Hawke's Bay Regional Council co-funded a pilot study on adaptation in Hawke's Bay. At the time there were no strategies or mechanisms in place to integrate adaptation to climate change into the planning processes of regional or local government. To ensure that any such strategies are effective in future management of land and water resources they need to be founded on an understanding of what climate change means to people on the land, what their present adaptive capacity is, and what issues and needs have to be addressed to help prepare for the future (Kenny, 2002).

Within New Zealand the rationale for focusing on farmers is clear. They are responsible for the management of 45 percent of New Zealand's land surface. This includes significant areas of land in watersheds that are prone to drought, flooding and erosion; that contain significant native forest remnants and where significant biosecurity threats exist and will potentially increase. The rationale for focusing on eastern New Zealand, beginning with the Hawke's Bay region, was because of consistent projections that eastern regions will experience warmer, drier conditions in the future. The risk of drought is projected to increase, as quantified in a recent NIWA study (Mullan et al., 2005), water is already a major issue in some eastern areas, and extreme rainfall events and associated flooding could also occur with increased frequency and/or intensity in the future.

Over a period of about six weeks a total of 40 people, predominantly farmers, were informally interviewed. People were targeted principally through recommendations from the Land Management staff at Hawke's Bay Regional Council. They were identified as having one or more of the following attributes: innovative and proactive land managers; good historical knowledge; good observers of change; influential in their industry group. Subsequently a workshop was held in Napier to present findings and provide an opportunity for dialogue between farmers, Regional Council staff and Ministry for the Environment and Ministry of Agriculture and Forestry representatives. Some key things that emerged from this work were:

- 1) Water was identified as the key issue for the future with lesser concern regarding direct effects of higher temperatures and biosecurity threats.
- 2) Farmers consistently indicated that they are already adapting, based in particular on experiences with the combined effects of drought and the impacts of subsidy removal through the 1980s and 1990s. This proactive view was linked to the wider

sustainability and affordability picture and the importance of working to develop resilient farming systems.

- 3) Climate change was generally seen as an issue for the future and hard to imagine.
- 4) There is a need to communicate the work of proactive farmers more widely.
- 5) A need to more clearly identify risks, and areas at risk in the region.

Adapting to climate change in eastern New Zealand

This pilot study provided the foundation for the ‘Adapting to Climate Change in eastern New Zealand’ project (Kenny and Fisher, 2003, Kenny, 2005). This work focused on a wider geographic spread in eastern New Zealand and aimed to develop a more in-depth view on adaptation from the perspective of farmers. Both the process involved in implementing this project and the outcomes of the work are very important in building understanding of what is needed to engage community in taking climate change and adaptation seriously (see Eden, 1996 for a useful discussion relating to why people have a tough time with climate change, Sarah Burch, pers comm.). This really boiled down to effective communication, both sharing relevant scientific information and listening to farmer perspectives and how they related global information to their local situation.

The process and outcomes

There were three key messages that emerged from the Hawke’s Bay pilot study, particularly in terms of engaging more widely with farmers:

- 1) The importance of targeting people who might be called innovators or leaders of change; people who are already proactively adapting and providing leadership in their community;
- 2) The importance of documenting the good things that are already being done of relevance to adaptation and, through this process, identifying more clearly what else needs to be done.
- 3) The need to communicate information in an easy to read and informative manner.

Through a combination of circumstance and lateral thinking an artist, with a background in education, was engaged in this work. This was part of a conscious focus towards finding creative and innovative ways to help bridge the communication divide.

Various means were used to identify suitable farmers, relying for the most part on points of contact in the four main regions that were covered (Bay of Plenty, Hawke’s Bay, Nelson/Marlborough, Canterbury). Despite quite significant effort, including targeted invitations and phone calls, turnout at workshops was generally quite low. A series of three workshops was held.

The first series was documented in Kenny and Fisher (2003). This publication was illustrated by Fred Robertson who visually captured the process that was used, involving:

- An initial mapping exercise through which participants located their farms, identified key climate features, and identified key issues.
- Responses to a generalised future scenario, consistent with NIWA projections (see Ministry for the Environment, 2001 and Wratt et al., 2004), for 2050 with conditions 1°C warmer on average, 10% drier on average and more extremes of drought and high rainfall events.
- Adaptations that are already happening and need to be happening.
- Adaptation priorities.

A key outcome that emerged from this initial phase of work and that further guided the process adopted in the remainder of the project was the importance of telling farmer stories for councils and ‘Wellington people’ to see. There was a strong desire to see a merging of science and practical farmer wisdom, communication and celebration of positives rather than focusing on negatives, and a need to keep information simple and eye catching in a way that empowered people to make their own decisions.

The second phase of work involved a second series of workshops and in-depth interviews with selected farmers. It became increasingly evident that issues were emerging at two different scales, the micro or farm-scale and the meso or regional-scale. In the second series of workshops two key questions were addressed:

- What are the issues and needs to create micro resilience? Participating farmers were provided with an A1 sheet of paper with an outline of a farm landscape and were invited to create a resilient picture.
- What are the issues and needs to create meso resilience? Participants were provided with an A1 photocopy of a regional map and were asked to identify what was needed to create regional resilience.

In parallel with these workshops a series of 12 in-depth interviews was completed, aimed at developing and presenting farmer stories. The shared wisdom of a farmer mentor to the project (Alec Olsen, farmer and regional councillor, Hawke’s Bay) was that ‘you won’t find one farmer who is the ideal, but if you pull together a number of stories you might start getting close to an overall picture of resilience’. These interviews provided greater depth to the micro resilience picture and identified further issues of relevance in terms of meso resilience.

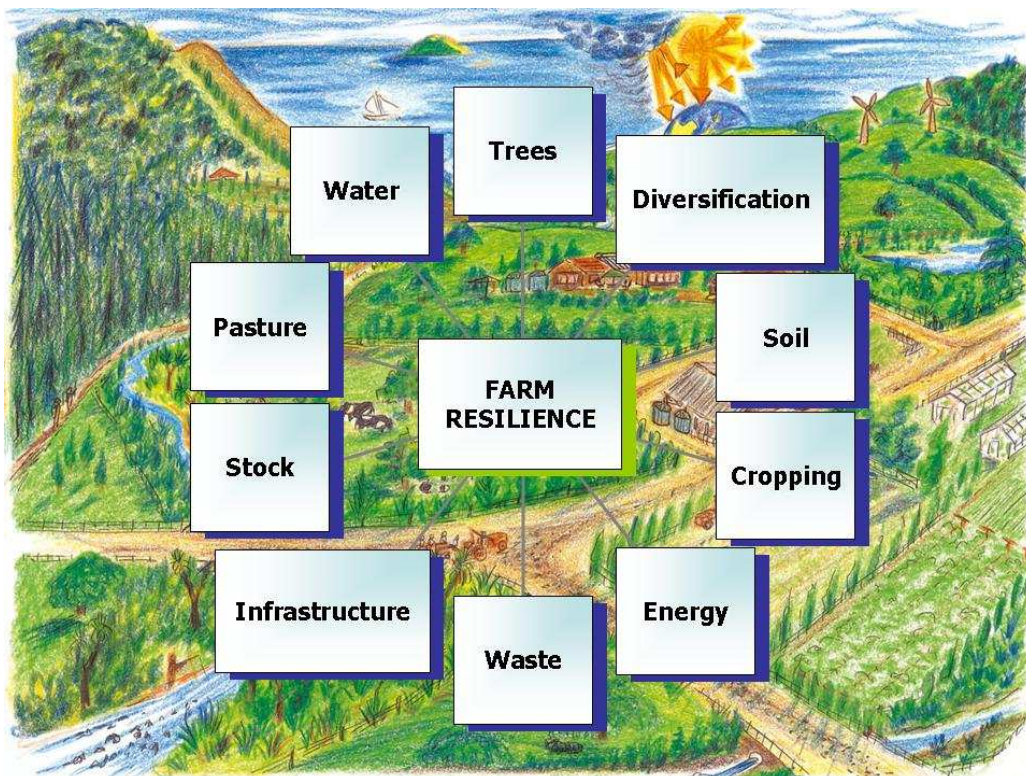


Figure 2: The farm resilience picture (art by Fred Robertson)

Some very important outcomes emerged from this work. It was very clear that there is a lot of information and knowledge amongst proactive farmers and when brought together there is a very strong resilience picture at the farm scale (Figure 2 and Kenny, 2005). This resilience picture is all-encompassing. It doesn't distinguish between adaptation, mitigation, sustainable development or any of the other multiple dialogues that are presently taking place in the climate change and wider literature. Smart farmers are tuned into wider issues and are thinking as much about the multiple benefits of trees as they are about alternative energy futures. At the farm scale things are treated in an integrated manner.

Key messages were that this good work needs to be made more visible and that the way forward in terms of engaging more farmers and the wider community was through an education-based approach not regulation. This process is already happening at a grassroots level, and in some cases has been underway for the last 40 years or more through local farmer initiatives. Regional Councils involved in a more education-based approach with farmers are consistently viewed more favourably by people on the ground. Another important message from farmers was a feeling that urban people need to be engaged a lot more in taking responsibility for their own territory while at the same time being educated about the positive things farmers are doing.

When challenged to address the question of issues and needs for meso resilience farmers struggled much more. What emerged at the meso scale were a lot of issues relating to urban/rural tensions, interactions with Regional Council staff, and in terms of education and communication. Issues around water, in particular, but other issues including biosecurity, biodiversity, energy, waste and infrastructure mostly revolved around tensions between different interest groups and the need to be finding ways for everyone to be working together for mutual benefit.

Bringing it all together

Through this grassroots work it became evident that there are two main elements to effectively engaging people and communities with climate change:

- 1) Local scale (micro) action, at the level of individual, household or farm. Identifying, supporting and promoting the successes of innovators who are leaders of change and exploring educative approaches aimed at engaging individuals in taking responsibility.
- 2) Regional scale (meso) interactions between different communities of interest that need to be facilitated and fostered in the context in developing and putting into action positive visions for the future.

Rather than shift away from individual behaviour and choice towards collective choice and decision making (Robinson et al., 2006) we need to be focusing on the interplay between action (individual behaviour) and interaction (collective choice). We need to be working creatively to foster interactions that lead to effective actions.

How can we facilitate this? The first step is to change our perspective (Figure 3) at the same time as changing the lens to give a sustainable development focus as suggested by Robinson et al. (2006). Society responses need to become the centre of attention much more than they have been, with both science and policy supporting society at large in addressing climate change and other issues. While there may already be some movement towards such a perspective there is still considerable work to be done.

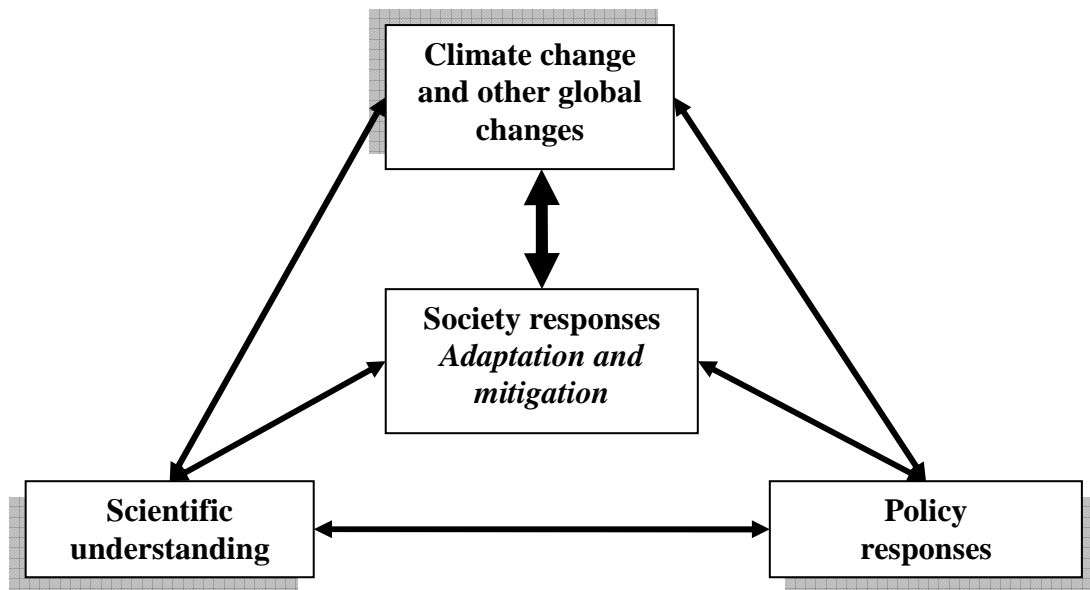


Figure 3: Changing perspectives to facilitate responses to climate change that are centred on society and their interactions with the environment

Shifting the position that we're standing in to view the problem makes a great difference. This is illustrated with two different perspectives of Hastings, Hawke's Bay (Figure 4). The view from the top of Te Mata Peak (Figure 4a) can be taken to represent the science and policy perspective of climate change. It is a broad, sweeping view but with some solid ground underneath. However, despite this grand view, it is impossible to see relevant local details. When we shift our perspective to a view from within Hastings (Figure 4b) we see both local detail and have a clear view of Te Mata Peak. Looking at Te Mata Peak from Hastings the form of a sleeping giant is clearly visible. There is a Maori legend associated with this form but in the context of this discussion the sleeping giant is used as a metaphor for the climate change issue. When standing in Hastings it is possible to view both local issues and the sleeping giant that represents global issues such as climate change. The view from Te Mata peak, representing science and policy, allows us to facilitate interconnections between the global and local scales. This capacity to facilitate interconnections is largely in the hands of the science and policy communities. The challenge is to clearly recognise Te Mata peak as a place to visit and Hastings as a place to live and to find the best ways to share perspectives gained from visits to Te Mata peak.



Figure 4a: The view from Te Mata Peak, Hawke's Bay, representing the broad, sweeping view that science and policy provide.



Figure 4b: The view of the 'sleeping giant' on Te Mata from Hastings, representing local perspectives on climate change.

Through working with eastern New Zealand farmers (Kenny, 2005) it became evident that there were some key ingredients to helping facilitate successful and effective responses to climate change. The most important ingredient was a recognition that effective responses to climate change require fundamental psychological shifts. The most proactive farmers are often people who have experienced some form of crisis and as a result have undergone a change in thinking and approach. This led to thinking about a range of issues and exploration of ideas that are not particularly high on the agenda at present:

- The psychology of change
- The role of innovators
- Change management
- Art/science interactions
- Town/country interdependencies

This is by no means exhaustive, but a brief discussion of each of the above helps provide further insight into the different ways of thinking and working that need to happen on the ground.

The psychology of change

Grothmann and Patt (2005) have presented a 'Model of private proactive adaptation to climate change' (MPPACC), at the core of which are two major perceptual processes, risk appraisal and adaptation appraisal that are attributed to individual decisions on adaptation. While this is a valuable addition to the climate change literature and provides a novel research framework in an area that has lacked attention it isn't clear how this model can be translated to the challenge of engaging individuals and community more widely. Rust (2004, 2005) presents a very different psychological approach to that of Grothmann and Patt (2005). As a psychotherapist and ecopsychologist she is questioning the role that psychotherapy can play in service of creating a sustainable world. Her discussions cover the historical disconnection between humans and nature and identify this as being at the core of our current state of affairs, both at the level of individual and global issues. The solution she offers, through psychotherapy, is the development of a 'sustainable self' that is connected with what she calls the other-than-human-world. This approach is founded on the work of Roszak (1992 and 2001) who believes that 'the great changes of our runaway industrial civilization must make if we are to keep the planet healthy will not come about by force of reason alone or the influence of fact. Rather, they will come by way of psychological transformation'. He further discusses the psychology of guilt that arises with the constant documentation of our individual and collective failings with respect to the environment and presents a compelling case for a much more positive, compassionate approach. Marshall (2001) talks about the psychology of denial as a key element in our failure to act against climate change. He draws on the writings of Stanley Cohen (Cohen, 2001) in identifying certain psychological processes that are consistent with lack of response to climate change:

- 1) Widespread denial, when the enormity and nature of the problem are so unprecedented that people have no cultural mechanisms for accepting them.
- 2) Diffusion of responsibility, or the 'passive bystander' effect.

Marshall (2001) further argues, essentially in agreement with Roszak (1992 and 2001), that denial cannot simply be countered with information and that information overload can actually have the opposite effect to that desired. He further identifies the need for momentum to shift the bulk of people and the importance of social support and validation by others.

The importance of individual action and the role of innovators

Innovation is recognised as something that comes about through individuals who tend to rely on insight and intuitions rather than a logical process. They tend to be doers rather than thinkers or planners and are not easily compartmentalised. These and other attributes, identified from experience working in the health and justice sectors in the UK (The Centre for Public Innovation, 2006) mirror experiences and lessons from working with proactive farmers in New Zealand. As an example, Geoff and Gill Brann (see Kenny, 2005) were doomed to failure through the media when they took over a former Department of Lands and Survey farm in the early 1960s. This view of failure was founded on a belief that the deforested, erosion prone land that they took over could not sustain a conventional pastoral production system. The Branns recognised this, but rather than see failure they saw opportunity and began to plant trees. Over a 40-year period they have converted sixty percent of their farm to a diversity of exotic and native tree species. Their work has been influential on neighbours, has led to protection of the small catchment that their farm is located in, and they have developed a freely accessible walkway through the farm as a means of educating the urban population. There are numerous such success stories within New Zealand and from around the world, but the majority are not widely known about and are not even in the view-finder of the climate change research and policy communities.

Change management

Important questions that were asked throughout the work with farmers (Kenny, 2005) was 'What is to role of crisis?' and 'Do we need crisis to change?'. The greatest successes were found to be farmers who had worked through crisis and used it as a learning opportunity to change what they were doing. These farmers show characteristics of the 5-10% of the population who have the capacity to be active managers of change

Change management is described in Wikipedia (2006) as *'the process of developing a planned approach to change in an organization. Typically the objective is to maximize the collective efforts of all people involved in the change and minimize the risk of failure of implementing the change. The discipline of change management deals primarily with the human aspect of change, and is therefore related to pure and industrial psychology'*

Change management can be either reactive or proactive. A reactive approach involves responses to macroenvironment change (external) whereas a proactive approach involves initiating change to achieve a desired goal (internal) (see Wikipedia, 2006). With climate change we presently have choice as to whether we 'wait and see' and adapt reactively or begin acting now and adapt proactively. We may not have such luxury of choice in the future. The key to proactive adaptation is that internal change is needed.

Engaging people in lasting, proactive, change is not easy as indicated by Byrne (2005) who comments that *'the odds of making lasting changes are almost always against us -- even when our very lives are at stake. That troubling fact only underscores the difficulty of altering the culture or direction of an enterprise populated by thousands of different people with different agendas.'* If we extrapolate these views to the scale of a global issue such as climate change it is not hard to imagine why adaptation has tended to sit on the sidelines. If making lasting

change is such a challenge for an enterprise of thousands, how can we bring it about for whole communities (rural and urban) in New Zealand and elsewhere in the world? In answering his own question ‘so how do we shift the odds in our favour?’ Byrne (2005) summarises the important insights shared by Deutschman (2005), as follows:

- *‘Real change isn’t motivated by either crisis or fear. The best inspiration comes from leaders who can create compelling and positive visions of the future.*
- *Small, gradual changes rarely lead to transformation. Radical, sweeping changes are riskier but often more effective, because they quickly yield benefits visible to everyone.*
- *Narratives, not facts, guide our thinking. Data on declining market share or quality problems won’t get employees to change what they do. Rather, appeals rooted in emotion are what best inspire people to alter course.’*

Deutschman (2005) also provides evidence, through a narrative on treatment of heart disease patients, that the most effective change comes about when people are actively supported in the change process.

The importance of managing change and the need to craft communities for the future is reinforced by Leaver (2005) who identifies the need for multiple interactions between diverse kinds of people and the importance of exploring different entry points to engaging them.

Leaver (2005) further identifies different forms for crafting community including:

- 1) Making leaderfulness present throughout the community.
- 2) Designing the community’s preferred future.
- 3) Orchestrating networks and movements to get better results.
- 4) Fostering the making of cities and whole neighbourhoods.

The experience and lessons from working with eastern New Zealand farmers is that all of the above are essential ingredients in developing a process, linking back to two key elements of recognising and supporting relevant actions and interactions.

The role of art and artists

There is very little happening to promote interactions between artists and scientists on climate change, anywhere in the world. Two notable examples are an art/science meeting that was held in Oxford, UK in September 2005 (Peter Gingold, pers comm.) and the Cape Farewell project (see <http://www.capefarewell.com/>). Within New Zealand an application to the Smash Palace Fund in early 2005 for funding to facilitate an art/science interaction on climate change was unsuccessful.

It is worth reflecting on the words of Stapledon who, in 1956, wrote to the Grassland Society (of which he was the founder) summer meeting in England.

‘Against the background of a life devoted to science, I have plunged headlong into history, literature and poetry. The result is that for the first time in my life I have been forced to realise to the depth of my being that facts and factors as such ... in the affairs of life ... mean precisely nothing; it is their mass inter-relationships and interactions – and these for all practical purposes are infinite – that mean everything.’

Active involvement of an artist in working with farmers on climate change and adaptation has highlighted the value and importance of working in creative and imaginative ways to bridge the communication divides that exist. McKibben (2005) rightly asks ‘Where are the books?’

The poems? The plays? The goddamn operas?'. How do we register climate change in our imaginations? This is neither a call for more sensational stories that preach to the converted nor a call for more stories from the marginal areas of the world. While such stories have valuable roles to play they can also contribute further to the psychology of guilt, denial, and a general sense of paralysis. We need artists to help guide us towards positive visions that are meaningful to local places and people. The role of art in providing insight into our relationship with nature is very powerfully shown through the art of Constable (see Gray and Gage, 2006). Constable's life (1776-1837) and art spanned the Industrial Revolution (1785-1830), which was a time of very rapid change and transformation. Many of his images show scenes of harmony between people, their communities, the wider landscape and the sky. In many ways he documented a way of life that was rapidly disappearing. In his painting 'Old Sarum' he very powerfully portrayed the decline of a civilization that had sought to dominate nature. While a reflection on the past this image also provides, in retrospect, a powerful forewarning of the future. Constable and his contemporary artists, poets and writers provided very powerful commentaries at the beginning of an era that we are now experiencing the full consequences of. Where are such commentaries now, in particular those that can help create visions for the future and engage people imaginatively?

Town and country interdependencies

Constable's imagery provides us with scenes of harmony between town, country and the wider environment. In the highly urbanised societies of the 21st century this sense of interdependency is often lacking. Over the last 30 years or more there have been calls for a radical rethink of our whole relationship with the land. For example, Bookchin (1976), presented a vision for sustainable communities that were founded on sound ecological principles including good soil management, tree cultivation and ecotechnology. This vision is no longer radical. In fact it is increasingly becoming a reality, as shown in the farm resilience picture shared by proactive New Zealand farmers (Figure 2) and through their comments on wider issues. Events such as floods, droughts, and dust storms ought to remind us that what happens on the land is of fundamental importance to the quality of life in urban environments. It is important therefore to briefly reflect on lessons from proactive New Zealand farmers in terms of what urban dwellers can be doing and are doing in some cases.

The farm resilience picture (Figure 2) can readily be reinterpreted for an urban resilience context (Figure 5). Right down to the individual household level there is scope for a whole range of initiatives ranging from alternative energy sources, such as solar panels, to storm-water management and control of biosecurity threats. In a recent study of alternative storm-water management options Vesely et al. (2006) found that an eco-innovation approach, involving use of storage tanks and gravel ditches, was comparable in cost to the conventional storm-water drainage system. The principal barriers related to lack of technical expertise, legal and planning issues, and resident perceptions of the eco-innovation approach as an inferior option. This brings us back to the view that, at the local scale, a combined adaptation/mitigation response approach is needed. Such an approach needs to take account of the overriding importance of sustainable futures and the need to recognise that human behaviour and psychology are at the core of successful, long-term, solutions. The latter is clearly illustrated through the perceptions of people regarding alternative storm-water systems and the effort required to engage them.

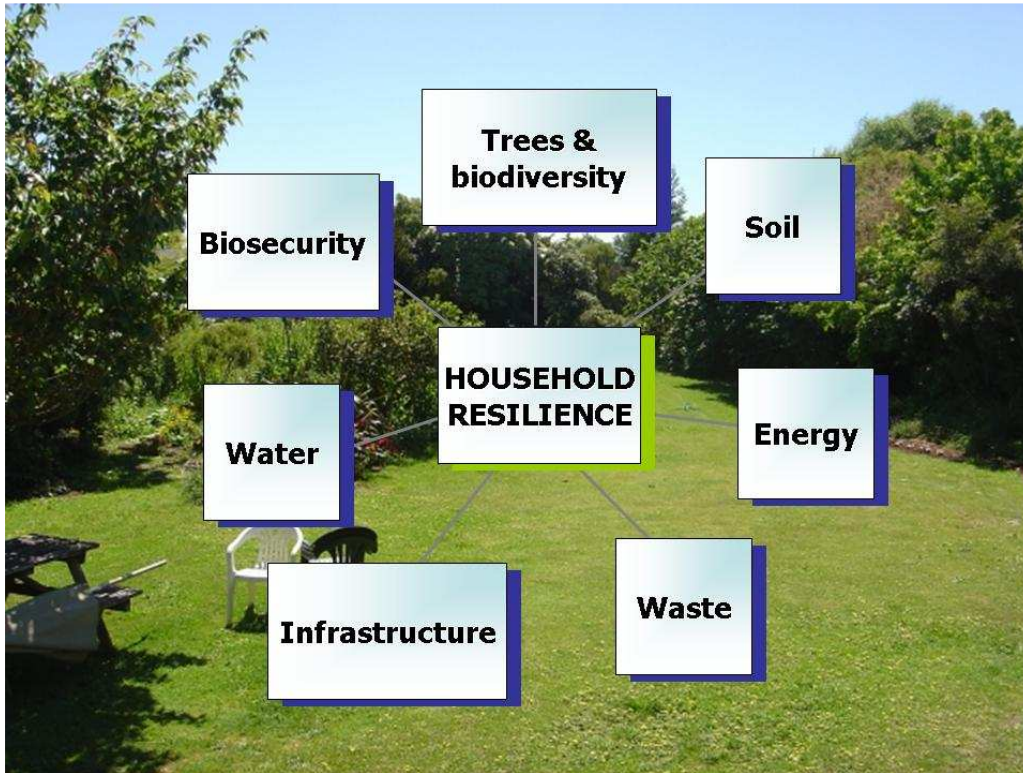


Figure 5: The household resilience picture

Conclusion

The conclusion, from 15 years of work on climate change (including research, capacity building and communication), is that at the core of the issue is human psychology and behaviour. There is a need to be shifting our attention much more towards addressing this. This was recognised by White (1991), who had a major influence on natural hazards research in the United States, and after decades of research concluded that *'the future condition of the globe's interlocking natural and social systems depends more on human behaviour than on the further investigation of natural processes, however desirable that may be'*. Both White (1970, in Kates and Burton (Eds), 1986) and others, such as Stapledon (1956, in Conford, 1988) have also talked about the interplay of knowledge and ignorance and the fundamental importance of honesty about what we are ignorant of in the application of (often limited) knowledge in our relationship with the environment.

The question is how we go about doing this. The view presented here, supported by experience in climate change research and in seeking to bridge the communication divide with New Zealand farmers, is that we need to be focused a lot more on how we work imaginatively with the vast amount of information, experience, wisdom and knowledge that is available to us throughout society. Climate change is an issue that increasingly requires active engagement and interaction between multiple and diverse interests and skills including scientists, policy-makers, the arts, the business community, psychologists, community leaders, educators and many others. This is not just a matter of challenging the focus of the IPCC (see Robinson et al., 2006) and re-thinking priorities for research. It requires us to challenge the science and policy communities to find ways to bring their knowledge and perspectives on to the ground much more.

We need to draw together the very rich and comprehensive global perspectives and understandings that we have and take ourselves onto the ground, to local places and communities. In this regard there is strong agreement with Robinson et al. (2006) that we need to shift towards a more integrated approach. This is consistent with lessons from working with New Zealand farmers and an artist. An initial focus on adaptation leads to multiple dialogues and information relating to possible futures. Climate change becomes a window through which we can explore possible futures. Such perspectives can then be connected with those gained through other entry points.

A key to success is to recognise and support the work of visionaries. The art of Constable provides reflections on our place in nature that are perhaps even more relevant today than they were 200 years ago, with the writing of Bookchin (1976) providing a contemporary vision that is no longer radical. Can we afford to be ignoring the radical and visionary thinkers among us now? In the words of Jack Nicholas, a very wise farmer who met an untimely death in 2004 (see Kenny, 2005) we have the knowledge to deal with issues but lack the will. This is not just a question of political will, in local places it is also about meeting the challenge of finding the most effective ways to motivate local people and communities to proactively change.

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