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Moving beyond “mitigation and adaptation”: examining climate change responses in New Zealand

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Despite the apparent failure of international negotiations and renewed criticism of the accuracy of climate science, responses to climate change continue in households, cities, fields, and meeting rooms. Notions of “doing something about”, or “taking action on” or “mitigating and adapting” to climate change inform practices of carbon trading, restoring native forests, constructing wind turbines, insulating houses, using energy efficient light bulbs, and lobbying politicians for more or less of these actions. These expressions of agency in relation to climate change provide the focus of our enquiry. We found that relationships or social networks linked through local government are building capabilities to respond to climate change. However, the framework of “mitigation–adaptation” will need to be supplemented by a more diverse suite of mental models for making sense of climate change. Use of appropriate languages, cultural reference points, and metaphors embedded in diverse histories of climates and change will assist actors in their networked climate change responses.

Keywords: climate change; action; governance; New Zealand; social networks

Introduction

In 2009, international negotiations on greenhouse gas emissions stalled and climate science was questioned in the media again (Berkhout 2010). The promise of global action and binding agreements seemed lost. However, climate governance connects people and practices across global, national, regional, local and personal scales (Kates and Wilbanks 2003). It is therefore about much more than the high profile negotiations between nation states for emissions targets. It is also more than the setting of strategies for cities, regions, and supply chains in responses to climate change predictions, which is currently the focus of much Intergovernmental Panel on Climate Change (IPCC) supported analysis.

Social networks are a prominent feature of climate governance (Bulkeley and Newell 2010). Multi-stakeholder networked arrangements are argued to fulfil a leadership role in the protection of global commons (e.g. the ozone layer) (Glasbergen 2010). Transnational networks for environmental governance have been fostered through the IPCC and United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties processes as institutionalised responses to climate change. Climate-oriented campaigns, such as 350.org or the Greenpeace Sign-on campaign, are often directed towards civil society and community-based organisations based on the argument that social networks are central to mobilising for social and environmental change.

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In New Zealand (NZ), problems of climate change and ideas of what to do about it have been contested through both science and policy arenas (Greenaway and Carswell 2009). Central government (CG) has funded research to reduce emissions in the primary sector (PS) and create business opportunities through new technologies. Local government (LG) dealt with the disestablishment of the Communities for Climate Protection – NZ (CCP-NZ) network and developed regional strategies with the primary and energy sectors. Meanwhile, non-governmental organisations (NGOs) and community groups planted trees, insulated houses and organised recycling schemes around the country.

Recent contributions from social theorists understand climate change as one among many science-informed political and economic trajectories shaping peoples' individual and collective practices (Wilson 2006, Aall *et al.* 2007, Betsill and Bulkeley 2007, Bulkeley and Newell 2010, Burch 2010). Hulme (2008, p. 5) stated "If we can understand from the past something of this complex interweaving of our ideas of climate with their physical and cultural settings we may be better placed to prepare for different configurations of this relationship in the future". We aim to contribute to this goal by providing a few of the empirical details required to show the "complex interweaving" by presenting responses to climate change that seeks to move beyond the heuristic of mitigation, adaptation, impacts, and risks (Jasanoff 2006, Hulme 2010, Shove 2010).

Moving beyond mitigation and adaptation

Our investigation of climate change actions considers the questions "What does it mean to take action on climate change?" and "How can we know action is being taken?". We find it useful to characterise climate change actions as capabilities (both individual and collective) that involve *making*, *organising*, and *representing* climates. Our position on "climate action" is informed by various theories of practice (see Giddens 2009, Shove 2010) with a specific focus on the idea that actions are achieved through distributed (or networked) relationships and practices. We work with the idea that climates are in the *making* through everyday routines and tasks, hereafter understood as practices.

Climates materialise and are responded through individual and collective practices and through intermediaries such as temperature gauges, policy documents, or trees (Latour 2005). Climates are organised through societal institutions. This political and institutional work can be via democratic processes of consultation, election, and liaison with members of parliament or via protest, campaigns garnering public support and influencing public opinion or consumer behaviours. Climates are represented through practices that get to know, characterise, predict and respond to climate change. A range of discourses, and meaning-making processes constitute climate change action and are constitutive of the other two elements (making and organising climates).

Our reading of literatures about both climate change and agency shows that action might take place through organisations, or communities of interest comprising networks of social relations, for example, in relation to the development of public education campaigns (Slocum 2004a, 2004b), energy efficiency technologies (Hobson 2006) or programmes of "climate governance" such as carbon offsetting (Paterson and Stripple 2010). Bruun and Langlais (2003) argue that networks are a particular form of social relations where knowledge is made to enable action to be taken. Networks, in contrast to hierarchies or markets, have been identified as central steering mechanisms in modern environmental governance (Bulkeley 2005). Social learning, organisational change, adaptive management, and collective action literatures have suggested that networked governance has been used to mobilise a broad range of environmental governance practices and

aspirations that actors deem desirable (Bulkeley and Newell 2010). Networked governance arrangements have been established across local, regional, national, or global scales through both vertical (policy to community) and horizontal governance arrangements (across communities of interest) (Lindseth 2004, Slocum 2004a, 2004b, Hobson 2006). Networked governance arrangements that respond to climate change are characterised by re-distribution of responsibility amongst state and non-state actors (Bäckstrand 2008, Pattberg 2010).

We have come to understand that knowledge making for climate action is situated in relations and practice, and is bound up in the political and social ordering of institutions (Hulme 2010, Lahsen 2010). It is intertwined in the cognitive, behavioural, and affective elements associated with taking action on climate change (Lorenzoni *et al.* 2007). “Knowledge” is knowing-in-practice whereby “as a regime of competence every practice is in some sense a form of knowledge, and knowing is participating in that practice” (Wenger 1998, p. 141). We suggest that this understanding implies a strongly relational underpinning of knowledge tied to specific communities of actors and to specific sites. This kind of relational knowledge comes from connecting, and is reciprocal between, actors and communities, with things and located in spaces. If knowledge production is as much action (a practice) as representation (a body of statements) then how knowledge is situated and framed among the social relationships – socialities – of actors becomes an important issue for action and the very nature of agency (Pink 2008). This leads us to consider the practices through which responses were enacted and the possibilities for action now and in the future, as well as the discourses of climate change.

Responding to climate change in NZ

NZ’s annual gross emissions had risen by c. 20% between 1990 and 2011, yet the country was still expected to be a net seller of units at the completion of the first commitment period (CPI) of the Kyoto Protocol (Ministry for the Environment (MfE) 2009, 2011, 2012b). Climate change was regularly featured in public discourse, particularly in relation to CG announcements and international negotiations (Conference of the Parties 15, Copenhagen, December 2009).

CG’s intention to “do its fair share” had been enacted by announcing a conditional target for reducing greenhouse gas emissions in August 2009 (Office of the Minister for Climate Change Issues 2009). The Government invested NZ\$48.5 million investment in the NZ Agricultural Greenhouse Gas Research Centre, and the establishment of the Global Research Alliance on Agricultural Greenhouse Gas as part of the country’s negotiations at Copenhagen in December 2009. The phased introduction of industrial sectors to the Emissions Trading Scheme initially established under the Climate Change Response Act 2002 was continued with the potential inclusion of the agriculture sector in 2015 (Climate Change Response (Moderated Emissions Trading) Amendment Act 2009). While awaiting further developments in international negotiations, the NZ government provided additional funding to allow the land-based sectors to adopt new practices and policies to support community waste minimisation, home insulation, and energy efficiency.

National climate policy has been recast several times, providing challenges for climate governance, undermining public confidence, and weakening support for the country to fulfil its Kyoto obligations. LG in NZ has funded and facilitated various climate change initiatives, primarily in connection with the CCP-NZ. CCP-NZ was the primary vehicle used by CG to support LG activities to reduce emissions from their own operations and that of their

communities. This programme was disestablished in June 2009 after five years of funding from the MfE.

CG continued to support mitigation schemes in regions by involving other agencies such as the Energy Efficiency and Conservation Authority (EECA) or by devolving responsibility for the administration of forestry incentives to LG through the Afforestation Grants Scheme. While public opinion sought action on the part of large emitters, LG had a mandate under the LG Act 2002 to ensure sustainable development for communities through long-term planning and a 2004 amendment to the Resource Management Act made explicit provisions for all persons exercising functions and powers to have particular regard to the effects of climate change (RMA Amendment Act 2004).

NZ's climate policy has been described as characterised by (1) a limited public understanding of scientific issues, (2) active lobbying by climate-sceptics, (3) a lack of consensus on policy directions among stakeholders and policy actors, (4) inadequate cooperation between government and business, (5) inaccurate forecasts of emissions, (6) governmental prevarication, and (7) a series of significant policy reversals (Boston 2006). Greenaway and Carswell (2009) suggested that the contestation and coalescing of science and policy informed climate change responses in Marlborough and Waikato. They suggested that climate change responses were influenced by the international prioritisation of research for inventories, linkages between sustainable development and climate change discourses, and a general shift towards mitigation and adaptation policies. This article continues the authors' interests in human dimensions of climate change to investigate relationships between governance of, and responses to, climate change in NZ between 2008 and 2011.

Material and methods

Our examination of climate change responses in NZ was informed by a multimethod research approach that was undertaken between 2008 and 2011. Research was conducted by mapping community projects using internet searches and semi-structured interviews; and undertaking desk-based reviews of media coverage and publicly reported opinion polls, and examination of climate action networks (see Table 1). The use of multiple

Table 1. Research methods (2008–2011).

| Research methods | Timeframe for data collection | Locality – sample |
|--|--------------------------------|--|
| Mapping community projects using desk-based research | 2008 and 2010 | LG, NGOs, and community groups involved in 644 projects identified in 2008 and 1065 projects identified in 2010 |
| Semi-structured interviews | May 2008 to May 2009 | 22 individuals from LG, primary sector (PS) (forestry, pastoral, and dairy farming), and community groups from in Marlborough and Waikato, and policy from CG agencies based in Wellington |
| Review of media and public opinion polls | February 2009 to February 2011 | 24 months of articles, blog posts, and YouTube videos collated using Factiva Database and Google Search Engine |
| Identifying networks | February 2008 to February 2010 | 16 groups, organisations, or associations established by actors engaged in climate governance with links to CG policy |

research methods enabled us to triangulate findings and to identify some of the ways climate change is being assembled (Collier and Ong 2005, Lerner 2011, McGuirk 2011).

In 2008 and 2010, we mapped community projects by collating a database of climate action projects around NZ. These projects were either CG initiatives, linked to LG, NGOs or community groups. Our approach was adjusted between 2008 and 2010. In 2008, projects were identified by (i) consulting a database of climate change programmes developed by CG,¹ (ii) internet searches on central and LG websites using key words (e.g. “climate change”, “sustainability”, “waste”, “education”, and “projects”), and (iii) follow-up conversations with individuals from community organisations and LG agencies to seek information on climate projects in each locality that may not have been identified through the web search. In 2010, we repeated the steps above to identify any changes from 2008 and a fourth step was added to identify particular practices used in climate action projects to deliver their desired visions and goals.

Projects were analysed using open coding that led to the development of an emergent typology of categories to describe each project (see Table 2). We also counted the number of projects per category of project and identified the types and numbers of actors involved (e.g. LG, NGOs, and community groups). There were cases where one actor could be involved with a number of different types of projects or one project may involve a number of different actors. In 2010, practices used in projects were identified (see Table 3). Differences between 2008 and 2010 in project numbers within a category were assessed using a chi-squared test within *R*, and where significant were adjusted for multiple comparisons (*R* Core Development Team 2010).²

Table 2. Typology of climate action.

| Action | Description |
|----------------|---|
| Adaptation | Address climate change adaptation through building resilience to anticipated future changes in climate variability and change |
| Agriculture | Address climate change issues in agriculture, including urban agriculture |
| General | General category where organisation or project covers mitigation, adaptation, education, and/or advocacy dimensions of climate change |
| Design | Addresses design for a building or build environment |
| Restoration | Involves the protection or enhancement of a natural area, commonly involving the enhancement of natural regeneration within a defined area |
| Energy | Improve energy efficiency, involve a shift from fossil to renewable energy sources, or lower rates of energy consumption. The climate change effect of such projects is to contribute to climate change mitigation through lowering the demand for carbon intensive energy types |
| Mitigation | Designed to reduce greenhouse gas emissions |
| Policy | Designed to analyse or influence climate change public policy (mitigation and/or adaptation) at the local or national government level |
| PRE | Projects with the explicit aim of reducing emissions |
| Sustainability | Aim to reduce the ecological footprint of the actor(s) involved in the project, and in turn reduce the carbon footprint of the participating agency |
| Transport | Aim to reduce demand for fossil fuel-based transportation energy through fuel switching, transportation mode switching, and/or behaviour change |
| Urban | Focus on reducing the ecological footprint of a specified community or set of participants with a particular emphasis on an urban setting. Such projects will often address sustainability issues in an integrated fashion cutting across energy, waste, transport, food security, and/or ecological restoration themes |
| Waste | Focus recycling and waste stream management, including composting, liquid, and solid waste minimisation |

Table 3. Practices for climate action identified in community mapping approach (2008, 2010).

| Practice | Description |
|--------------|---|
| Advocacy | An action (usually a form of communication) that comprises a request for someone other than the advocate to undertake behaviour change or policy change |
| Education | Methods and innovations used by educators in their effort to be effective at either raising awareness, increasing understanding, or conveying information. Educational projects are those that offer an information service in the form of a formal educational programme, an advisory service, or public awareness programme |
| Facilitation | Actions designed to help someone else (other than the project proponent) undertake behaviour change. Facilitation tools are those methods used by facilitators to bring about behaviour change in their target group |
| Funding | Self-explanatory |
| Management | Actions undertaken by the project proponent within their own organisational or project boundary (e.g. inside a household, business or organisation, or inside a defined boundary where the project proponent has a management role – e.g. a parcel of land) |
| Networking | Participant–participant communication to facilitate behaviour change (e.g. web-based car pooling) between participants |
| Planning | Self-explanatory |
| Research | The production of information, rather than producing management outcomes |
| Standards | Quality assurance infrastructures designed to improve the quality of behaviour, goods, services, management, or any activity deemed relevant to the standard setting entity |

We conducted semi-structured interviews with key informants involved in climate action projects³ and climate governance between May 2008 and May 2009. First, we interviewed individuals based in Marlborough and Waikato who were involved in particular climate action projects or climate governance. These localities were chosen because we had undertaken interviews there a few years earlier (Carswell *et al.* 2007). They also provide insights from two distinctly different regions. Waikato is largely a dairy farming region in the North Island and Marlborough is a wine growing region in the South Island. Second, we interviewed policy-makers from local and CG agencies based in Wellington.⁴ The interviews lasted up to 90 minutes and were audio recorded. Each interview covered particular climate action projects as well as climate governance in NZ. We asked interviewees to explain the origins, development and implementation of projects with reference information sources, relationships with other actors (domestically or internationally), and challenges or lessons learnt from these projects. Interviewees were asked to draw a map of their networks to gain insight into particular projects and the associated relationships with other actors.

Interview transcripts were coded using NVivo (2008) software into topics of *activities*, *organisations*, and *networks* to consider what activities were taking place, who was doing these, and where and how these activities were being undertaken. Each quotation used is accompanied by a pseudonym that indicates the sector each interviewee is connected to,⁵ the category of action with which they are associated (as per typology developed in the survey), and whether the quotation relates particular to projects in Marlborough, Waikato or NZ.⁶ These pseudonyms are also used if interviewees referred to other sectors.

Further desk-based research was conducted: first, we reviewed public opinion polls and media coverage (broadcast and social media to provide a context in which to understand interviews and survey results. A portfolio of coverage comprising articles, blog posts, YouTube videos, and publicly reported opinion polls concerning climate change over a

24-month period was created.⁷ This was reviewed to (1) identify key events, organisations, and people mentioned; (2) examine how climate change had been represented, and (3) key messages being communicated over this period. The portfolio also enabled us to identify other networks, groups, and organisations engaged in climate governance in NZ. We conducted further desk-based research to understand their respective origins, membership, and activities. This provided a map of a range of actors involved in climate governance.

Results

In this section, we examine climate change responses, hereafter described as “actions” that are involved in making, organising, and representing climates. Also, we present some practices responding to climate change in NZ and show how these were networked and contested in relation to climate actions. These actions need to be considered beyond the mitigation–adaptation framework that is common in climate change discourse.

Making climates

In 2008, we identified over 644 climate-related projects profiled on the Internet. In 2010, we identified 1065. Examining the changes between 2008 and 2010, we found an apparent 70% increase in the number of projects that could be identified as climate change oriented since 2008. This increase may partially reflect the use of an improved search methodology in 2010. Projects involving ecological restoration (50% increase; $P < .05$) and sustainability (230% increase; $P < .05$) experienced the most growth between 2008 and 2010. Waste, energy, transport, and policy initiatives also showed significant increases ($P < .05$) since 2008. The number of mitigation projects significantly decreased between the two dates ($P < .05$) (see Figure 1).

In addition to those projects identified from the surveys, we identified other projects during interviews. CG agencies were developing policies and research strategies with the PS in connection with established networks, such as the Research Innovation and Technology Transfer Technical Working Group (see Table 4). CG agencies were also working with the insurance sector to assess property-related climate risks, e.g. flooding, which were linked to global initiatives to address climate change by the insurance sector. Meanwhile LG agencies were developing energy and transport strategies involving stakeholders in a series of events and networking meetings.

Findings from the mapping of climate projects and our interviews indicated that some projects were presented as both mitigation and adaptation efforts. For example, restoration projects that involved planting native flora adjacent to waterways are part of efforts to protect or enhance a carbon sink (mitigation) and contribute to adaptation activities through the resilience of a catchment to future climate variability. The climate change focus here is on mitigation through the protection and/or enhancement of a carbon sink or reservoir. Ecological restoration projects also make a contribution to climate change adaptation through the enhancement of the resilience of a catchment to likely future climate change impacts such as increased flood frequency or drought.

Media attention in 2009 focused on NZ’s commitments through the UNFCCC, the Kyoto Protocol, and the Copenhagen Accord, but climate actions underway around the country were rarely reported. Our research identified things such as waste, trees, buildings, and roads as well as practices making legislation, project proposals and regional energy strategies were all intertwined in climate actions. Also, landfills, living rooms, conference rooms, windy ridges, and riverbanks were important yet largely unreported sites for climate

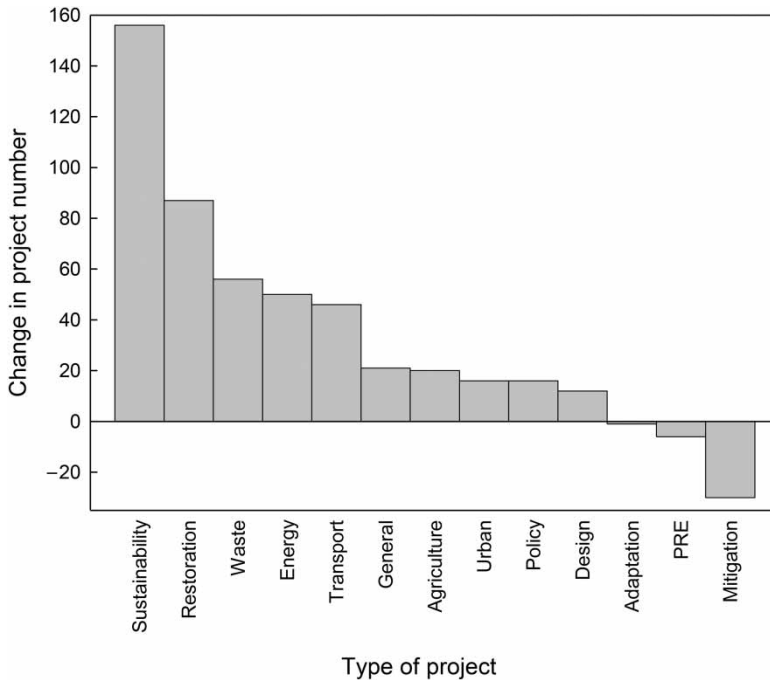


Figure 1. Change in climate actions being taken between 2008 ($N = 644$) and 2010 ($N = 1065$), grouped by project type (see Table 3 for descriptions of types of projects). Note: PRE, projects to reduce emissions.

action in NZ. We found that networks in NZ did create a collective knowledge of climates and that the possibilities for acting were bound up with actors' relationships to the objects and environments.

Legislative changes in 2004 positioned CG to address mitigation, while LG addresses adaptation concerns. This separation of responsibilities between central and LG was far from clear in practice.

... the big thing in mitigation has been the ETS [Emissions Trading Scheme], or central government doing research through AgResearch⁸ to come up with new technologies. It does look like mitigation is central and adaptation is local. But I think it's not as clear cut – you actually have to look at the policy instrument. And whether it's more appropriate for the policy instrument you happen to be using, to be centrally or locally driven. (CG – Policy – NZ)

We identified people taking action on climate change from across most sectors in society but those most heavily involved were NGOs, and local environmental community groups, e.g. Te Pahu Landcare group. LG organisations had the second highest number of climate change initiatives, e.g. community funding schemes and adaptation resources. LG, alongside local NGOs (LNGO) (usually community groups), were responsible for many more projects than any other groups of actors (Figure 2). Increased activity between 2008 and 2010 was observed for both local and national NGOs, LG, and CRIs (Crown Research Institutes) ($P < .05$). There was no change in the activity of the other actors. Numerous initiatives through the EECA led to CG actors also featuring quite highly in our surveys.

Table 4. Climate action networks identified through desk-based research.

| Networks | Actors involved | Examples of climate action |
|---|--|--|
| (1) Greenhouse Policy Coalition | Major emitters from industrial sectors and mining industries | Engage with policy-makers to ensure a policy framework for a sustainable business sector Works to ensure benefits are commensurate with cross and distributed across all sectors of society |
| (2) NZ Farm Forestry Owners Association | Owners of forestry plantations | Share knowledge amongst members Develop innovative voluntary responses to climate policies (forestry practices) Develop codes and standards for industry players in forestry management Engage with development of policy and legislation |
| (3) CCP-NZ | LG authorities | Develop vehicle fleet initiatives Reduce energy consumption in corporate buildings through lighting, printing, and other operational efficiencies Review transport and stormwater design as activities to mitigate and adapt through settlement planning |
| (4) Climate leadership Forum | Government advisors | Revise and advise government on implementation of policies |
| (5) Business Opportunities Working Group | Representatives of PS and associated professional services | Provide a “sounding board” for development and implementation of strategies |
| (6) Adaptation Working Group | | Provide advice to other technical groups developing policies for sectors |
| (7) Research Innovation and Technology Transfer Technical Working Group | | |
| (8) LEARN | International scientific community | Collaborate for research to measure and mitigate effects of emissions |
| (9) CarbonNet | Representatives from research organisations | Provide expert knowledge to parties interested in climate change mitigation |
| (10) Pastoral Greenhouse Gases Research Consortium | | Promote engagement and partnerships between researchers and industry Make investments in research activities |
| (11) NzOnet | Scientific peers | Convene network to facilitate and integrate research on evaluation of market-based instruments for climate change mitigation |
| (12) EcoClimate Group | Representatives for research organisations | |
| (13) Climate Defence Network | Local, National, and International NGOs | Make submissions to policy documents |
| (14) 350.org | | Support international campaign events and community action around NZ |
| (15) Sign-on and Greenpeace | | Create visions for the future |
| (16) Tck, Tck, Tck, Oxfam | | |

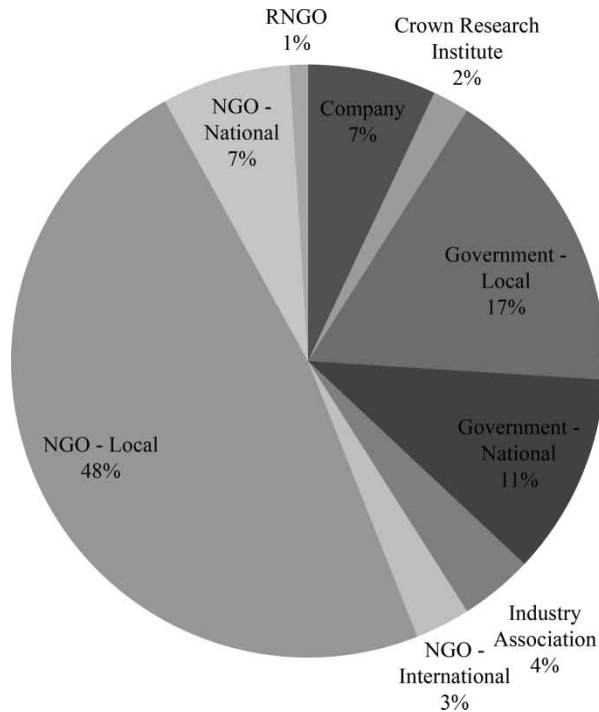


Figure 2. Types of organisations taking climate action in 2010 ($N = 1065$).

Public opinion polls relevant to climate change, published between 2006 and 2010 reveal support for the NZ Government, major emitters and all New Zealanders to take action on climate change. This public discourse of “climate change requires urgent action” was at times strong, at others, more equivocal. Public opinion on the whole suggested that major emitters should take direct responsibility to reduce emissions. CG climate actions have focused on regulatory programmes, such as the Emissions Trading Scheme where major emitters, except the agriculture sector, have responsibilities under legislation; and on investment in research and innovation in the agriculture and forestry industries. Thus, the public discourse contrasts markedly with the CG’s prioritising of investments in research for the development of new agrarian technologies.

In contrast to public discourse, interviewees implicitly connected climate change to other sustainability projects, for example, one person stated

It really doesn’t matter whether it’s branded climate change, and it really doesn’t matter who delivers it. What you’re wanting is that behaviour change. (CG – Policy – NZ)

Our research supports Bulkeley and Moser’s (2007) assertion that climate change is being used as a vehicle to realise complementary policy objectives of Government. We found this to be the case with regard to waste reduction, behaviour change programmes, and restoring biodiversity through tree-planting schemes. The quote above and that below illustrates two perspectives on climate change demonstrating that while behaviour change is the priority from a policy perspective, but that such behaviour is situated in a context (see Shove 2010) where actions (including recycling waste) enable individuals and communities to engage with global issues at home, at work or in paddocks.

So we've given people an alternative and we've given them the opportunity to actually participate in dealing with climate change and some of those global issues in their home. (LNGO – Waste – W)

Organising climates

Opportunities for individuals, as consumers, householders, and citizens, to respond to climate change have generally been facilitated through what can be called global citizen networks previously researched by Glasbergen (2010) and Slocum (2004a, 2004b). International NGOs are catalysing this movement through international campaigns, primarily targeted at decision-making in international policy forums such as Copenhagen and Bonn. This global focus for action and leveraging of global climate change statistics (e.g. 2 degrees and 350 degrees) gives attention to the global aspects. Citizen campaigns convey ideas of societal change and a strong sense of urgency to reduce emissions. However, these campaigns have not yet influenced broader domestic policy, have little foothold in the agri-forestry policy debates in domestic climate policy, and have weak links with the formal policy development networks in NZ.

While the CCP-NZ network was formally disestablished in 2010, LG continued to engage climate governance alongside other actors, such as NGOs and local community groups. One interviewee warned that capacity building – an important feature in the CCP network – needed to continue despite the disestablishment of the CCP-NZ.

... people don't recognise that capacity building is an on-going process and, you know ... you can't just sort of pull the plug or you need to be more targeted earlier on. There has to be some other different delivery mechanism. (LG–CG – Policy – NZ)

In Waikato, LG investigated opportunities to establish a regional network of climate change actors to create a regional strategy. Other actors are using social networking activities, such as the “green drinks network”,⁹ or social media technologies to share information and develop connections on the topic of climate change and sustainability issues (see, for example, Celsias 2012). However, the ability of NGOs and community groups to undertake climate action was hampered by changes to funding and associated support from government agencies.

Citizen campaigns have led to the forging links with others around the world. In Waikato, a zero-waste initiative has developed connections with other domestic and international recycling groups. These connections enable the sharing of information and development of skills concerning waste reduction. For example, the zero-waste initiative used international connections to examine what happened to waste after exportation to China. As a result the network result decided to stop exporting waste on the basis that

the environmental impact of our waste left in China on the villages was too great for us, so ... all we were doing was transporting our waste issues to another country which had less environmental controls. (LNGO – Waste – W)

The decision to deal with waste locally, rather than export it elsewhere indicate the network's development of informal rules and standards that are outside the national or intergovernmental arena (Glasbergen 2010). There was a common idea that the network of relations becomes a site for governing and for action. Networks enable individual and collective actors to assemble in response to a common concern. The taking of action is part of the development of norms and practices that were characteristic of the network (such as the decision to stop exporting waste to China as a result of the environment impact discussed above).

The investigation of climate change networks led to the identification of 16 groups, organisations, or coalitions that engaged with aspects of domestic climate governance in NZ. Some networks involved actors from the PS, policy agencies, and the science community; while others involved LG and NGOs (see Table 3). In contrast to those networks linked to international campaigns, some networks that were established in direct connection with a government policy or strategy often had a limited lifespan, whereas those with less specific purposes are likely to have been in existence for longer. The Forestry Stakeholder Reference Group, for example, existed between 2007 and 2008 to provide advice on the implementation of the Emissions Trading Scheme. In contrast, the Greenhouse Policy Coalition was formed in 1996 to ensure a climate change policy framework that “secures a growing competitive, profitable and sustainable business sector”, and continued to take political action through making submissions to CG and parliament and participating in research work.

Some networks are collectives that had formed in relation to policy developments, while others had a formal status established under statute as an association or a non-profitable charitable trust. Yet others emerged as part of a broader response to sustainability concerns or as part of the relationship between the Crown and Maori under the Treaty of Waitangi.¹⁰ These networks often involved traditional representatives of the agricultural economy and were fostering views within the network and with other communities on “business as usual” and the use of technology to provide solutions.

We found evidence of networks being used by policy agencies to seek consensus or facilitate relationships in the hope that these agencies would take action, seeking to integrate, or break institutional and organisational silos:

One of the key ways we’re looking at doing that [enabling and supporting] is through the Adaptation Forum and places like that where there’s actually a space for people to talk about adaptation, making sure that the direction of things that we’re doing actually meeting the needs and requirements and priorities of sectors. And it’s key for us that actually rather than central government going directly to land managers per se that actually we’re engaging with local government and the sectors themselves because they’re the ones primarily dealing with the land managers. (CG – Policy – NZ)

I think the nice thing about it was ... when we started with the group they obviously had an interest in climate change ... but they spent the first couple of meetings just discussing what adaptation was, and why it was important. ... So that actually we found that our members were then using opportunities when there were conferences, seminars, grower meetings, board meetings, ... [and] ... using that as an opportunity to put climate change adaptation on the table and discuss it. And by the time we’d finished the process ... I probably see them as, they’ve become like “adaptation champions”. They’re willing to put it on the table. (CG – Policy – NZ)

We have been informed by Pink’s (2008) description of networks as assemblages of actors, embedded in social relationships, creating and sharing knowledge, and making climate governance. One LG agency, for example, supported a waste reduction project led by a community group by awarding a contract to provide waste management services, or a community group promoting environmental education received funding and information from a CG agency. The connections and relationships between actors involved in climate actions can be linked to practices that are particular to the programme of climate governance. For example, policy initiatives concerning sustainable land management used the practice of award schemes to enable individuals, including landowners and LG, to share experiences and build a network.

Comments about “circles of concern”, “circles of influence”, champions, and leaders indicate that actors are realising and strengthening their networking capabilities informally to build capacity within the communities, for example, people involved with soil conservation and resilience to drought in Marlborough. Similarly, networking practices were used in Waikato to mobilise action among local communities to changing contractual arrangements around waste. Networking was one of the social practices (i.e. routines and everyday activities) identified in our surveys through which interactions occur, and where the governance of climate change was ordered and orchestrated (Shove and Walker 2010). Other practices identified included education-type tools (used to raise awareness and provide information), and the facilitation of actions (where actors assist other individuals and organisations to undertake behaviour change (see Table 4).

Representing climates

Various actors were adapting their information resources to their particular needs and using a variety of communication channels such as newspapers, radio shows, specialised newsletters, and information pamphlets.

If you want individuals to change the way they’re doing things, you then need to actually get the right information through the right channels, in the right way, to actually enable them to understand, make decisions, to change their businesses. (CG – Policy – NZ)

This quote indicates the strength of belief in the power of information in enabling action. For those seeking to share information, raising awareness means weekly and monthly communication with other local and national actors and more frequent engagement with international actors at events and conferences. Such practices can be used for “targeted and tailored information provision” (Lorenzoni *et al.* 2007, p. 456). For those seeking to raise funds, regularity of contact with potential funders is also important (Andonova *et al.* 2009, as observed above in connection with the CCP-NZ).

Climate change discourse in relation to many projects was infused with the language of project management. Terms such as *visions*, *goals*, *outputs*, and *impacts* created a common language shaping how community groups, LG, and businesses plan and communicate the impact of their actions. In addition, actors are developing ways to indicators and using social media technologies to support climate action projects. Indicators and reporting mechanisms are technologies used by actors to share knowledge in the network and render the impacts of such action visible to others, including policy-makers. In response to a perceived lack of information by individuals involved in the development of clean technologies, alternative web spaces have been established to enable the creation and sharing of information among parties interested in climate change (e.g. Celsius Blog (Celsius 2012)). Virtual spaces enable networks of actors to interact, which leads to action for climate change similar to the cyber-communities identified by Bond (2010).

Instead of waiting for regulatory action by central or LG, others are engaging in conversations with friends and colleagues to encourage individual or collective action. Actors are then sharing and engaging with others about their journey of taking action by reducing emissions, mitigating remaining emissions, and educating others as the quote from a representative of a leading company illustrates:

We’re trying to achieve basically to reduce our carbon emissions first and foremost and then mitigate the remaining carbon emissions so, you know, our efforts are much better spent in

educating other industries, other people along those kinds of lines and we see that as part of our reduction projects well by opening our intellectual property up but also making reductions ourselves, keeping relevance in what we're doing and letting the people who are experts do the lobbying. (Co – Sustainability – M)

But it's more using a collective and participative approach that is reflective in terms of you don't own the process. You enable a process, you participate in that process, but you don't pull "I'm from CG agency, you've got to listen to me, this is how it fits in". Yeah, it's allowing a dynamic to grow, if you like, and become its own entity and using that not just for CG agency but also for the sectors as well. So, yeah, there is reciprocity. (CG – Policy – NZ)

Between 2008 and 2010, the practice of using a "climate change" label decreased from 50% to 26% of all ecological restoration and sustainability projects. Ecological restoration or sustainability projects that indirectly address climate change appear to have increased at the expense of "explicit" climate change projects (including "mitigation" projects). Interviewees who avoided labelling their projects as "climate change" cited concerns that the label might negatively impact on the uptake of the project among participants.

One interviewee observed that it might be better to encourage behaviour change through best practice land stewardship rather than linking the actions to climate change. For some, climate change is currently a topical driver, but is entwined in best practice land stewardship. For others, climate change has been represented as a threat and has negative implications for the country, as it is no longer seen as an opportunity but rather as a cost:

Climate change or the whole sustainability, it can be a huge cost to us or it can be a huge opportunity, depending on how we play it out. When we first got engaged we were playing it out as an opportunity, now I think it's being played out as a cost and that's disastrous to New Zealand. (Co – Sustainability – M)

In terms of climate change it's raised a lot of issues with people in the community – some of the people in the community wanted it because they wanted to save the planet, some of the people wanted to do it because they wanted to be wise with resources. (LNGO – Waste – W)

As such, framing of climate change is identified as a possible factor that may constrain or enhance capacity and capability to respond to climate change (Moser 2010b). We found that such terms, while associated with pragmatic action and focused on current action, enabled the creation and sharing of knowledge of what it means to act in the world opening up of exchange of ideas with the broader spectrum of climate action.

Discussion: moving beyond a mitigation–adaptation lens

Climate governance in NZ spanning CG policies, research projects to reduce emissions, and community actions and campaigns perpetuates a dominant market-based ideology and ecological modernisation approach in which individual actors are passive and uninvolved consumers rather than active and engaged citizens (Lindseth 2004, Slocum 2004a, 2004b, Hobson 2006, Paterson and Stripple 2010). This reflects the "severe problem" articulated by Wynne in 2010 where "the dominant prevailing scientific knowledge already carries tacit imaginations of human and social actors and capacities, and also (usually by default, without deliberate intent) imposes 'the' public meaning on the situation and its actors" (Wynne 2010, p. 300).

Climate change action projects often connected mitigation and adaptation with activities of ecological restoration and sustainability (Bulkeley and Moser 2007, Lorenzoni *et al.* 2007, Bulkeley and Newell 2010, Moser 2010a, 2010b). This relationship between

climate change and other concerns indicates the continuation of the sustainability journey during uncertain times for individuals and communities, which may connect with policy objectives and yet is not limited to that scope, as observed by the quote below.

[Climate initiatives] are not cohesive enough and it's not, it doesn't have a high strategic contextual vision because all these things are just bits of sustainability. (LG – Policy – M)

In the context of international negotiations and consternation about the climate science, climate actions were underway a diverse range of places and times, ranging from local rivers to parliamentary committee rooms. By expanding our view of climate action as broader than mitigation and adaptation, we identified many situated examples where people take action in accordance with the sociality of that particular network and where action is represented, enacted, and articulated across the land, water, air, in buildings, and in text.

Science has identified that the problems of climate will be a barrier to identifying what actions are indeed being taken to respond to this knowledge. Climate science is often central to the “we need urgent action” discourse. If knowledge and action are distributed through networks, where might a climate scientist’s look for indicators of action? Until they can recognise that actions will not be framed through the dominant (over determined) climate change discourse they will not be able to see that actions are taking place and will continue to say that more must be done.

While the NZ government continued efforts under the auspices of “doing our fair share”,¹¹ our research identified various practices, communities, and LG actors continued to take action, potentially beyond their “fair share”. LG and community groups were navigating the ebb and flow of climate change policies to continue on their sustainability journeys. Our consideration of social processes that constitute climate action led us to consider how actors have navigated paths through the contested flux of NZ’s political, economic, scientific, and climatic governance trajectories.

We found climate action was shaped by present political and economic agendas as well as by people’s aspirations for the future they want for NZ. We identified conceptions of climate action linking across everyday decision-making, political, and strategic activities as well as articulations of theories of social and global change that influence how actors understood themselves in the world. Our framing of action as a continuum expands the notion of “climate action” often framed as a heuristic of mitigation, adaptation, impacts, and risks. As illustrated in Table 5, actions were *making climates* by changing conduct in spaces and enrolling things, individuals, and communities into everyday practices such as riparian planting of flax on riverbanks; actions were also *organising climates* by establishing planning processes or standards to change institutional arrangements or advocacy activities to change policies; and practices of education and facilitation which were *representing climates*, prompted actors to consider what climate change means and raised questions of agency.

Cullen (2007, p. 228) observed that it is “only when we understand what climate change means to us and NZ society will we all be ready to embrace effective new policies to deal with it”. As actions for climate change were undertaken, understanding and knowledge of climate change and sustainability was also being created. Thus “knowing things and doing things were not separable”. Further, knowledge about climate change can understood as constituted through networks of people in places, at specific times, in connection with material things. Actions making, organising, and representing climates are entwined with the socialities of networks, which are situated in time and space, often in connection with material objects (Pink 2008).

Table 5. Examples of climate action identified in interviews.

| | Examples of climate action | Examples of actors involved | Site of action and space where networks are (re)created | Type of network | Practices |
|--------------|---|--|---|---|--|
| Making | Individual household insulation | Individual homeowners Energy conservation authority | Households Local town halls | Friendships, personal connections Communities of interest | Sharing information and experience |
| Organising | Development of policy Social movements Lobbying government Liaison with representatives of political institutions Opinion surveys | Citizen groups Lobby groups | Parliamentary committee rooms Farming field days | Formalised networks constituted as groups, fora, coalitions organised campaign groups | Rule setting Capacity building Campaigning |
| Representing | Reframing climate change as an opportunity rather than a risk Rethinking land use and interaction with the land | Individuals, collectives | Conference rooms Meeting rooms Fields | Informal and formal networks of researchers and colleagues Relationships between landowners and scientists | Conference presentations Conversations |

Conclusions

Climate actions identified in this research indicate a broader engagement with discourses of sustainability negotiating steps towards a lower carbon economy over a longer timescale, rather than solely aligned with a mitigation–adaptation framework. This reflects the fluctuation and periodic alignment of climate governance with discourses of sustainability, the knowledge economy, and economic growth. While successive governments adopt policy positions favouring voluntary rather than mandatory action, communities in NZ continue the sustainability journey by trading carbon credits, restoring native forests, and lobbying politicians. Community actions have moved beyond the domestic governance to develop networked relationships with others around the globe.

Networks of actors remain central to renegotiation of the climate policies, the scaling back of CG support and the fluctuating engagement with climate change. Networks enable actors to respond to climate change through creation and sharing of knowledge, enrolment of material objects, and engagement in philosophical questions of what it means to act in the world. LG-facilitated networks can play a critical role in strengthening of relationships across CG and community groups in order to build capabilities within NZ to respond to climate change. Within such an exploration, opportunities may arise to engage in the creation and sharing of knowledge for climate action by actors within science and research, with policy and business communities, and with wider communities.

We conclude that this study, while highly specific to NZ, reveals the importance of paying attention to everyday responses to climate change and the new images of citizenship and climatic relationships opening up through actions. Further critical and reflexive consideration of how people make sense of and respond to climate change may create opportunities, however momentary, to transform economic and political responses to climate change. Finally, we suggest that the framework of mitigation–adaptation will need to be supplemented by a more diverse suite of mental models to make sense of climate change. Use of appropriate languages, cultural reference points, and metaphors embedded in diverse histories of climates and change will assist actors in their climate actions as well as open up dominant framings, such as mitigation and adaptation or citizen-consumer (Barr *et al.* 2011) to hint at possibilities for continued action.

Notes

1. MfE's Sustainable Management Fund; the Ministry of Agriculture and Forestry's Sustainable Farming Fund; and the Communities for Climate Protection run by International Council for Local Environment Initiatives (ICLEI) (CCP-NZ).
2. Version 2.11.1, R Development Core, R Project.
3. Some interviewees were invited to participate on the basis that they had been involved in previous research. Others were identified using the snowballing technique.
4. Wellington is the capital of NZ and the base for most CG agencies.
5. For example, interviewees from LG are indicated with, those liaising between LG and CG policy agencies are; members of the PS, companies (Co) LNGO, community groups, and CG policy agencies.
6. Marlborough – M, Waikato – W, New Zealand – NZ.
7. Each month we collected all articles featured in the first five pages of the Factiva database; the first 50 results from the Google search engine for blogs and the first 20 YouTube videos originated in NZ or about NZ concerning climate change.
8. AgResearch is a Crown Research Institute owned by the NZ Government and focused on supporting the pastoral sector through scientific research and development (AgResearch 2012).
9. Green Drinks is a self-organising network of people that meet regularly in cities around the world. These social meetings often involve a presentation on environmental issues relevant to members (Green Drinks International 2010).

10. The Treaty of Waitangi (Te Tiriti o Waitangi) is the treaty signed on 6 February 1840 by representatives of the British Crown and Maori chiefs.
11. "Doing our fair share" is the term used to describe the NZ government's establishment of the Emissions Trading Scheme to reduce emissions relative to developments internationally and in science. See Ministry for the Environment (2012a).

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