Science for Communities

Developing a climate change adaptation system for health outcomes: Stakeholder perspectives

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Executive summary

This is an explorative qualitative study to determine stakeholder views and expert knowledge on climate change related adaptation planning for health. It builds upon a previous report that outlined a number of considerations scoping a process for climate related health adaptation planning. This study aimed to identify the components of an adaptation 'system' for health by drawing upon an understanding of the Viable System Model (VSM). By considering health adaptation to climate change using this system, we provide a view of the organisation of agencies and activities in order to provide context and structure for adaptation planning and implementation.

Key insights from a central government agency workshop were used to frame semi-structured interviews from a range of health and health-determining sectors (sectors that influence health status) from one region of Aotearoa New Zealand. The wide range of perspectives from these interviews were then presented at a second regional workshop for review. Use of this structure allowed comparison of both central and regional perspectives framed using the VSM.

Observations about health adaptation planning for climate change in this report are that:

- Mana whenua are partners in decision making
- community voices are included that enable effective action; local action should therefore reflect diverse community needs
- the goal of any national adaptation plan for health should be for health gains and relate to wellbeing, rather than only health care services
- health and wellbeing outcomes can be achieved through minimising negative impact of climate change eg, health impacts of heat; and by maximising health gains from mitigation activities eg, active transport options
- many influences on health are outside health sector control but may impact on health services
- many influences and decision-makers on climate change mitigation and adaptation are outside the health sector
- a health response to climate change adaptation should be 1) how health care services need to adapt to meet demand generated from climate change; 2) supporting health and wellbeing outcomes from decisions and actions of others
- clear national direction setting enabling policy that includes principles and resources to support local action

Effective adaptation actions that support health and wellbeing outcomes will require shared goals and understanding of the boundaries for health-led adaptation. The central and regional insights show a role for health agencies in numerous climate adaptation activities, decisions and responses, including the ability of the health sector to set its own adaptation actions. Key activities that should be led by the health sector include health infrastructure planning, health education and training (public and industry education), health sector capacity building and providing health expertise (a health lens) across climate change related adaptation activities. However, as many health impacts identified are likely to be outside the control or remit of health and the health sector, many adaptation responses will likely be led by non-health agencies.

The study found consistency in health adaptation co-ordinating activities across both local and national agencies was important. In particular, with health and health-determining sectors. Co-ordination is needed to ensure that agencies work together to generate more effective positive health and wellbeing opportunities and outcomes. Resourcing for health co-ordination to climate change at national and regional level will support the operational functions which currently do not match well with the current capacity and capability of the health system. An important consideration is that without adequate health representation in climate adaptation activities, there is a risk of transferring hidden costs to the health system.

There was some uncertainty in who made decisions that related to climate change and health adaptation activities. There was general agreement that health adaptation planning should be centrally led but that it allow for flexibility of implementation at the local level. There also needs to be iwi co-ordination across all of these functions as well as co-ordination with health, non-health agencies or health-determining sectors to avoid adaptation decisions made outside the health sector that could indirectly impact health outcomes.

Current intelligence systems are mostly designed for other purposes, although intelligence data could be used to inform climate adaptation health planning. It is not clear whether there are any systems in place that monitor the adequacy of services or interventions for supporting health outcomes in response to changing climate.

Many policy functions are already in place but are not being used to specifically consider climate related health impacts. These functions include much of the public administration structure such as Te Tiriti o Waitangi and the Resource Management Act.

Five actions for consideration are provided in this report that individually or collectively can support health adaptation to climate change. They are:

- development of a health national adaptation plan for climate change

- Te Tiriti o Waitangi led health adaptation planning for climate change
- support equitable outcomes for wellbeing and population health that relate to climate change adaptation planning and action
- enacting enabling policy
- providing a clear role for the health sector and health care services to support climate change adaptation planning and action.

1. Introduction

1.1 Climate related impacts to health

Even if heat trapping greenhouse gas emissions (GHG) ceased today, the slow response times of the oceans and ice sheets will still result in changes to climate[1] in the future that cannot be avoided. It will result in increased global temperatures above pre-industrial levels that will continue for some centuries as well as changes to weather systems, sea level rise and other indirect impacts (IPCC 2014; The Royal Society of New Zealand 2016, 2017). Anticipating and addressing the adverse effects of anthropogenic climate change (hereafter climate change) will become increasingly important to prevent or minimise any health and health system[2] impacts.

Health and health system impacts are likely to fall unevenly upon different groups and communities such as the old and the young, those with chronic illness, those socially excluded and refugees and immigrants, as they may have insufficient means to adapt. For Te Tiriti o Waitangi to be upheld, Iwi/Māori must be considered, and adaptation may need to take on a different form to address distinctly Māori health impacts and actions. Adapting to climate change is now a major challenge faced by health sectors globally and a serious threat to sustainable development. Excluding the health sector in climate related adaptation planning can miss critical actions to protect population health and can result in policies and programmes in other sectors inadvertently causing or contributing to adverse health impacts.

[1] Changes in the mean climate and/or variability of the climate that persist over long periods, in response to human activities (Intergovernmental Panel on Climate Change 2014).
[2] As defined by the Ministry of Health, see https://www.health.govt.nz/new-zealand-health-system

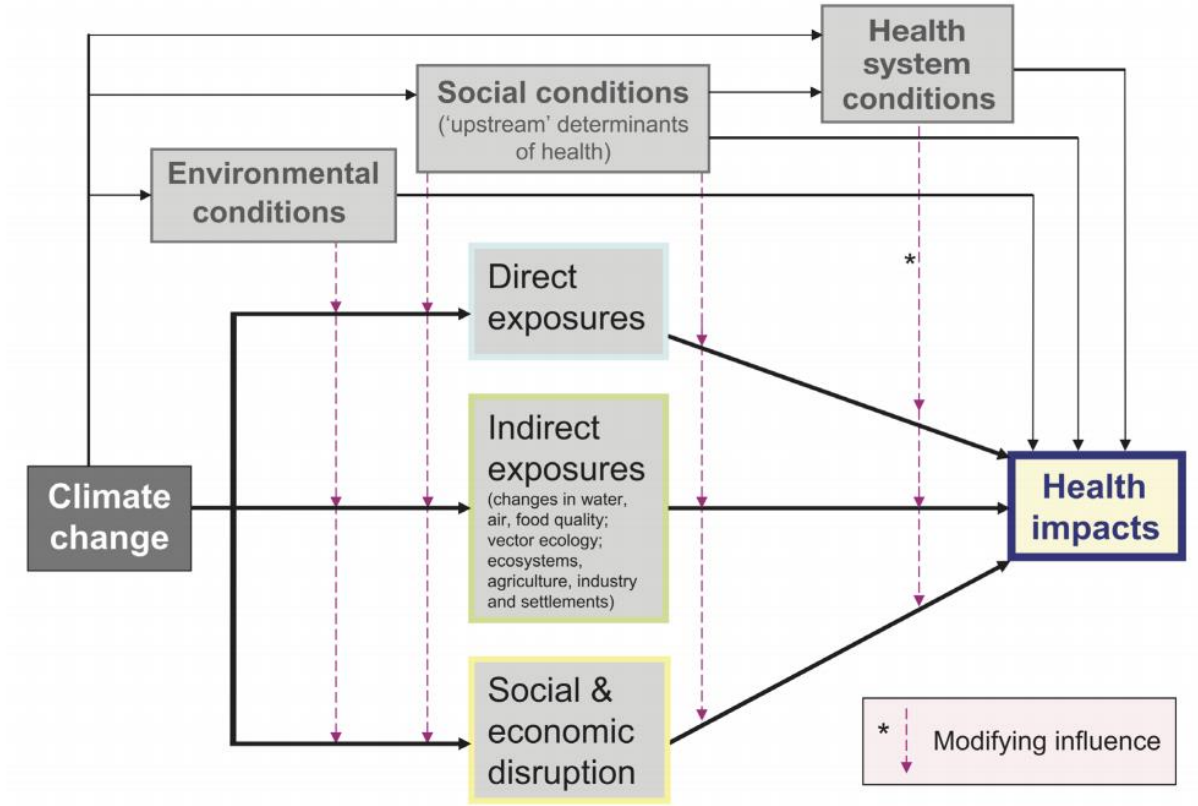

Figure 1: Schematic diagram of pathways by which climate change affects health, and concurrent direct-acting and modifying (conditioning) influences of environmental, social and health-system factors, modified from IPCC 4th Assessment Report 2007

Figure 1 displays the links between climate change on direct and indirect acting exposures, and social and economic disruption that can impact health (health impacts). Direct action refers to the ability of the health system (eg, health care and public health capacity and capability) to respond to health impacts from direct and indirect exposures as well as interconnected social and economic disruption. Environmental, and social conditions directly act on health impacts and health system conditions. Each of these conditions also act as a modifying influence. There is a growing amount of literature that discusses the co-benefits of climate action (mitigation of greenhouse gases) that could bring beneficial health outcomes. For example, measures to support active travel (eg, walking and cycling), reducing emissions from vehicles, and increasing physical activity that are correlated with a protective effect on multiple chronic conditions (Macmillan et al., 2014).

1.1 Mitigation and adaptation in a health context

Mitigation addresses the causes of climate change. In a health planning context it would focus on the reduction of greenhouse gas emissions including those from the health sector. Adaptation however is referred to as 'the process of adjustment to actual or expected climate and its effects resulting from greenhouse gas emissions

already released into the atmosphere and those that may be released in the future' (Climate Change Adaptation Technical Working Group 2017). The IPCC Fifth Assessment Report defines adaptation as 'the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects' (IPCC, 2014). Health adaptation may even be considered as equal to prevention (Ford et al 2014). Given recognition of the health risks posed by climate change, adaptation has emerged as a key component to reduce risk (Watts et al 2015).

More generally, the New Zealand climate change technical advisory committee has defined effective adaptation to mean:

> '…..that New Zealand's current and future communities are able to reduce the risks from climate change impacts over the medium and long term by:
>
> - reducing the exposure and vulnerability of our natural, built, economic, social and cultural systems
> - maintaining or improving the capacity of our natural, built, economic and social and cultural systems to adapt' (Climate Change Adaptation Technical Working Group 2018).

All of these definitions are relevant in the context of health adaptation to climate change. However, for clarity in this work, we define adaptation as 'the process of adjustment to actual or expected climate and its effects in human systems: adaptation seeks to moderate or avoid harm or take advantage of beneficial opportunities.'

1.2 Adaptation planning – Aotearoa New Zealand health context

There are some legislative frameworks that guide climate change risks, for example, The Climate Change (Zero Carbon) Act 2019, the Resource Management Act (RMA) and other local government Acts (see Section 4.10 and Appendix C). The Zero Carbon Act must consider health effects amongst environmental, social, ecological and cultural effects, and must also consider those effects in the preparation of a national adaptation plan. The RMA states that local government must have regard to the effects of climate change, with a specific focus on adaptation.

From a health perspective the recent health and disability review remarks that in addition to demographic changes, the impact of climate change, technological and research advances, evolving consumer expectations, and social and cultural changes, provide both opportunities and pressure for New Zealand's population and

wellbeing (Health and Disability System Review 2020). The advantages of early adaptation to benefit health appear not to be mentioned by the review.

At the time of writing this report, the Ministry for the Environment (MfE) was leading the first national risk assessment process and preparing for the first national adaptation plan as required under Zero Carbon Act.

It is within this context that ESR has undertaken the research included in this report. It builds upon a previous report, Bolton et al (2019) that outlined a number of considerations for scoping a process for climate related health adaptation planning. This report supports health adaptation to climate change by:

- identifying the role of the Ministry of Health and health sector agencies in leading and supporting strategies and activities related to adaptation to climate change for health outcomes
- clarifying the roles, responsibilities and organisation of central government and regional agencies to support joined-up adaptation planning and action for health outcomes
- analysing the relationship between the national risk assessment, national adaptation plan and national health adaptation plan
- determining the goals and objectives of a health national adaptation plan (HNAP).

1.3 Lessons from reviewing health adaptation plans

An ESR review of health in adaptation plans (Bolton et al 2019) found that there was no common framework or process in their development. However, existing health adaptation and general adaptation frameworks did contain consistent elements. Among some of them were governance, policy and management that integrates adaptation into decision making; research, monitoring and management of data and information, including the use of indigenous knowledge and application of the best available evidence; building climate and response capabilities and adaptation to health risks; consideration of vulnerable groups and communities; communication and knowledge sharing across sectors.

The review also identified several key considerations that are applicable to HNAP development for New Zealand. Some of these were: whether a HNAP considers both ‘health’ and ‘well-being’ and what comprises ‘health’ and ‘well-being’ in health adaptation planning; how should the HNAP be co-ordinated from national to regional or local level; the need to consider how iwi/Māori would be active participants within NZ HNAP development; should mitigation and adaptation for health be considered in the same plan; how are other sectors co-ordinated and included in health adaptation

planning and vice versa; and how health actions or implementation of actions are financed and prioritised.

The next section describes how this study was used to determine stakeholder views and expert knowledge on climate change related adaptation planning and action for health. The study aimed to identify the components of an adaptation ‘system’ for health.

2. Methodology

2.1 Using a viable systems model to frame health adaptation to climate change

This study has drawn upon the understanding of a 'system' from The Viable System Model (VSM). The VSM developed by Stafford Beer is located within the cybernetics branch of systems thinking (Beer 1985). Cybernetics centres around the study of organisations as interacting systems. Beer identified several functions (called systems) and relationships between these functions, required for an organisation to remain viable within a changing operating environment. The systems of VSM include operations, co-ordination, control, intelligence and policy (Jackson, 2019; Leonard, 2008; Ríos, 2012; Walker, 2017). In this report, the VSM has been used as a framework for both understanding current organisations and systems (made up of multiple organisations), and for designing organisations and systems.

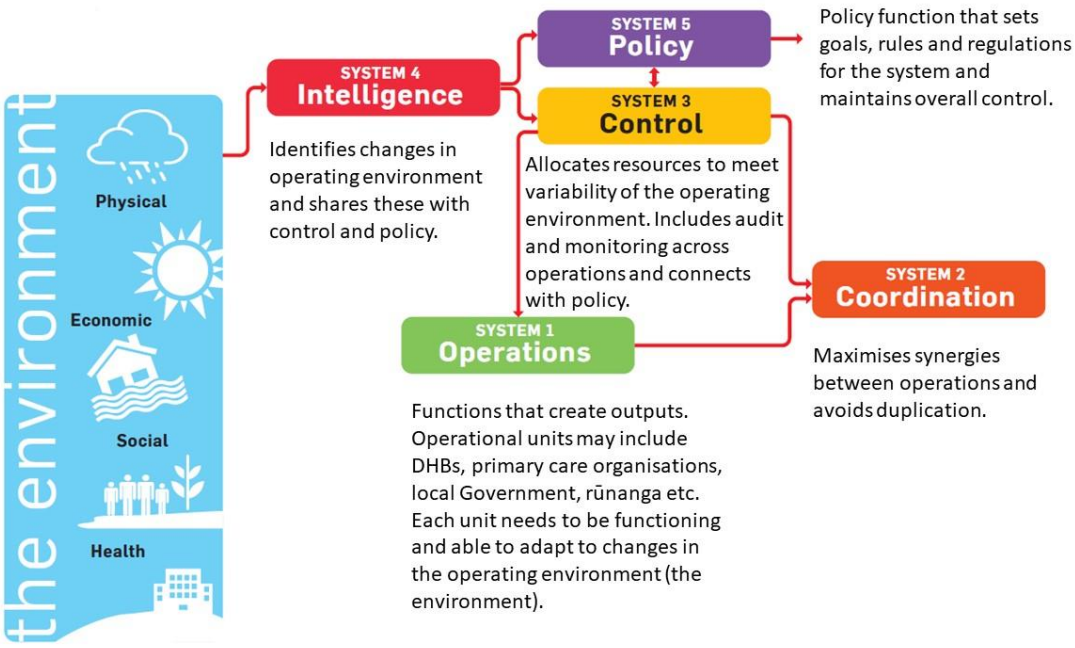

Figure 2: Simplified schematic of the viable system model using climate change as the changing operating environment and the functions within the health system

Conceptualising adaptation to climate change for health as a viable system, draws attention to functions across all of the five types of system (policy, intelligence, control, co-ordination and operations) as well as their interaction with the external influencing environment (operating environment). Using a VSM framing, research questions relate not only to 'what' actions are needed, but also 'who' does these actions, and 'how' are actions identified as the right choice for the time. VSM pays attention to changes in the external environmental in which it operates, for example

physical, economic, social, health that are influenced by changing climate (Figure 2). That system is made up of sub-systems, each of which in itself seeks to adapt and remain viable within a changing environment, emphasising the importance of co-ordination, policy and intelligence. For adapatation to climate change, the VSM highlights the need to consider the interaction of adaptation efforts across social and economic policy domains, organisational boundaries and governance jurisdictions, within an uncertain yet changing operating environment.

2.2 Gathering stakeholder perspectives

Two sets of stakeholder perspectives were sought. First, those from across central government agencies and second, those from across regional agencies.

2.2.1 Central government agency workshop

A workshop was held in July 2019 that sought to identify key issues and options for climate related adaptation planning for health. Informed by the VSM, the workshop was structured to consider the requirements for a climate change adaptation system for health:

- **goals** and **boundaries**
- **operational** functions
- **co-ordination** functions
- **intelligence** functions
- **control** functions
- **policy** functions.

The workshop was attended by 17 people from eight Government ministries and departments:

- Ministry of Health
- MfE
- Ministry for Primary Industries
- Ministry for Civil Defence and Emergency Management
- Ministry for Business, Innovation and Employment
- Ministry of Transport
- Treasury
- Department of Conservation.

A series of group activities were used to illicit ideas about functions across the five systems of the VSM. The ideas were then grouped, themed and presented within the VSM model. Findings and discussion from the workshop are presented in section 3 and a more detailed description in the appendices (Appendix A, D-E). The insights

come from both the themes developed from workshop activities, and comments participants provided at the end of workshop when reflecting on themes.

The summary notes provided in this report were provided to all workshop participants. Participant consent was sought for reports and other publications.

2.2.2 Regional case study methods

Semi-structured interviews were conducted with 12 participants from one geographical region.

Participants were selected to provide a range of perspectives related to adaptation planning and response within the region. For this reason, whilst focused on adaptation planning for health, participants were sought from organisations within, and external to, the health sector. Participant organisations included iwi and kaupapa Māori support services, local and regional government, non-governmental organisations representing particular populations (such as youth climate advocacy, Pacific peoples, youth, and older people), district health board funding and planning, health care and public health services.

Participants were initially identified through researcher networks, with snowball sampling used to identify further participants to approach (Streeton, Cooke, & Campbell, 2004).

Interviews were semi-structured. This means that a common set of questions are used in each interview (see Appendix D). However, the interview is conducted in a conversational style, allowing questions to be asked within the flow of discussion. This allows the interview to move past set questions and explore related issues identified by the participant, and to explore the participant's experience and expertise.

Potential participants were emailed an invitation to participate in the study which included an information sheet and consent form. In total, 12 representatives were invited to participate in the study between December 2019 and January 2020. The interviews were conducted in person and ranged from 30 to 60 minutes in duration. The interviews were audio-recorded with the consent of participants and recordings were kept confidential to the research team for analysis purposes only.

Interview questions were informed by the VSM to create discussion about adaptation actions and planning from the perspectives of supporting policy, intelligence/information needs, co-ordination and operational units and activities. Questions were also asked about which adaptation planning and activities have taken place or are underway.

Following the regional interviews, a half-day, face-to-face workshop was held at ESR in June 2020 to share the key insights from the regional interviews. This was a condensed version of the workshop used with the central government agencies. The workshop used a series of group activities to test the functions identified by the central agencies and regional interviews. The workshop was attended by six regional stakeholders. Participant consent to use workshop notes in reports and other publications was sought.

A peer review process was utilised to consider ethical research processes, and possible risks to participants, drawing upon the Royal Society of New Zealand Code of Professional Standards and Ethics. Processes included informed consent, maintaining anomnimity of participants, and providing an opportunity for participants to see and reflect on the draft analysis.

3. Findings and discussion

The following section is a shortened version of the central government workshop, regional interviews and workshop findings. It considers the functions required for a viable climate change and health adaptation system. It first discusses the goals and boundaries required for the system and then briefly discusses the findings from each of the VSM components. A detailed discussion of the central government workshop and regional interviews and workshop findings can be found in Appendix A.

3.1 Goal and boundaries

Defining goals helps us to understand what a system for climate change adaptation is trying to achieve. Participants described a shared vision or goal, that included top down leadership, recognising local/regional uniqueness and co-ordination between agencies.

All participants shared the perspective that adaptation should support communities to build resilience and adapt in ways that meet community aspirations. Organisational goals, often driven by legislation and Government policy, should align with the aspirations and needs of communities. We consider the concept of 'enabling' policy, as articulated through regional stakeholder interviews, to be an important goal of national adaptation strategy and plans.

Another consistent perspective is that adaptation should aim to support health and wellbeing outcomes, defining health as more than the absence of disease to include interaction of wider determinants of health. The role of the health sector was considered to be twofold. First, it should ensure that health care and public health services meet the changing demands related to climate change. Second, it supports positive health benefits from mitigation and adaptation activities that are led outside of the health sector. Supporting equity in health and wellbeing was a common theme related to the goal of adaptation. In particular inclusivity and diversity were identified as goals for organisations working with specific communities (ie, mana whenua, youth, older people, Pacific peoples and disability groups).

The regional stakeholders view was that currently, health and the health system was considered by external health organisations to be only hospitals and clinical care. Wider aspects of health, such as public and environmental health, were less well understood. Regional participants at the workshop agreed that it was important that the definition of "health and the health sector" was understood by all parties, including communities. This shared understanding could benefit the health system by increasing support or influence policy decisions from key health determining

sectors. It was widely thought that without health as a key informant in decision making, the impacts from climate events could pose an unnecessarily high burden on the health system in the future.

We considered that an adaptation system for health, if focused on wellbeing rather than only health care delivery, will need to be inclusive of different sectors and organisations that can influence climate related risks to health, and health outcomes. A challenge for functions that control and co-ordinate is to understand how individual organisational goals interact to create health and wellbeing outcomes, eg, the design of active transport, management of urban heat traps, or improving quality of urban waterways, and how to include these interactions with communities. There was uncertainty from stakeholders about the role of the health sector in leading control and co-ordination functions. For regional stakeholders, it appeared that local government is currently taking a leadership role, although inclusion of health was considered to be patchy.

3.2 Operational functions

A number of operational functions are led outside the health sector (climate change response, environmental and social conditions) but can influence health system conditions (Figure 1).

Climate change can exacerbate existing health inequities and adaptive capacity, eg, the increased need for a heat pump or air conditioning with more variable temperatures therefore impacting on those with less income. Whilst there are some adaptation actions that can be taken by individuals or even individual communities, those with more resources will be able to improve their adaptive capacity more than those with fewer resources. Without considering equitable outcomes, inequity from negative climate impacts on health and wellbeing are likely to increase. Equity impacts of adaptation actions need to be explicitly considered, as do the possible downstream impacts on the health sector of adaptation decisions.

A very strong sentiment from stakeholders, particularly regional stakeholders was that many health impacts are out of the health sector's control, but the health sector pays the price eg, obesity, car accidents. In other words, if health impacts are not considered by other sectors, the hidden cost is transferred to the health system, a sentiment shared by the World Health Organization (WHO 2019).

If there is to be a strategic shift of operational functions to achieve a new or altered goal and adapt, then the control function needs to be able to increase, shift or alter the distribution of resources to support that goal. Each operational function needs resources. For example, if the operation is waste management, then those waste services need to be resourced.

3.3 Co-ordination functions

As health and wellbeing outcomes emerge from the interaction of multiple direct and indirect determinants of health, co-ordination between activities and organisations is required to achieve strategic shifts in health, wellbeing and equity. Most participants recognised the need for a mechanism to co-ordinate and engage across different sectors with emphasis on inclusiveness, equity and diversity. This co-ordination mechanism also needs to be resourced, solutions-focussed, transparent and evidence based to support decision makers and create enduring relationships.

At a regional level, there was a concern that some co-ordinating functions are absent eg, the provision of psychosocial support (following emergencies). Co-ordination mechanisms do however exist at a regional level, although supporting health outcomes is not their primary purpose. Inter and intra agency co-ordination, dedicated resources and dedicated time are required to create a shared understanding of health and wellbeing impacts associated with climate change.

Currently the capacity for health to engage in such a mechanism was considered limited because of financial, staff or institutional constraints. Legislation could be used to address these constraints. A clear vision of the outcome sought would ensure all stakeholders were travelling in the same direction and to an agreed end state. This will ensure alignment of planning activities across all sectors.

3.4 Control functions

An essential component of the control function is for central government (national) and regional decisions to be led with or by iwi.

The Waitangi Tribunal report on stage one of the health and services outcome kaupapa inquiry, (2009), WAI2575, highlighted the importance of iwi and Māori being actively involved as partners in design and delivery of primary health services. The report outlined several principles derived from Te Tiriti o Waitangi, which were identified as relevant for planning and delivery of primary health care services. As a starting point, these principles could be used in the planning and delivery of climate change-related adaptation for health outcomes. In summary the identified principles were:

- tino rangatiratanga, providing for Māori self-determination and mana motuhake in design and delivery
- equity, commitment to achieving equitable health outcomes for Māori
- active protection, act to achieve equity, that Treaty Partners are well informed
- options, provide for, and resource, activities that are culturally appropriate and support hauora Māori

- partnership, working in partnership in governance, design, delivery and monitoring.

At a regional level, there was agreement that decisions should be made nationally while individual DHBs implemented health adaptation at a regional level, to reflect regional variability. For DHBs to do this they need capacity to support decisions across multiple sectors to maximise health and wellbeing outcomes. If health and wellbeing are not explicitly considered, the implications are that some mitigation, or adaptation, decisions from non-health sectors may prove to be maladaptive.

Existing control mechanisms identified include: A Minister of Health's letter of expectations to DHBs, RMA and national policy statements, district plans, carbon budgets, emission trading scheme and other penalties and incentives. A challenge is to develop control mechanisms that support enabling policy and a common framework that supports effective and relevant adaptation actions at regional and local levels.

3.5 Intelligence functions

The intelligence function of a viable system supports control and policy functions by identifying changes in the environment, as well as changes across operational functions. Several existing intelligence functions were mentioned, each of which described ways to inform planning, provide evidence to support decision making and identify, and support vulnerable groups.

Although most participants were able to describe health impacts associated with weather/changing climate and indirect impacts, it was less clear who was collecting that information or whose responsibility its collection was.

Apart from resourcing to increase engagement, existing intelligence functions could be adapted to avoid duplication. These intelligence functions include applying a health lens to relevant policy decisions. This function would require co-ordination that redefines responsibilities so that climate related health impacts are taken into account. In relation to these functions, Hess et al (2012), suggested that institutional learning at multiple levels and adaptive management may be useful tools for increasing adaptive capacity. They suggested the use of a centralised tool repository that increases focus on institutional learning, modelling and adaptive management in order to increase the resilience of local public health systems.

Some key intelligence challenges include applying long-term flexible thinking, 'climate sceptics' at decision making level and re-focussing climate issues to include both mitigation and adaptation. Other participants identified the need for Aotearoa to

think about its ageing population, as well as understanding and supporting its indigenous people.

3.6 Policy functions

Currently, there is limited policy directly related to climate change adaptation designed to guide decisions and activities of regional and local level agencies. An exception is within the RMA and related guidance, discussed below. At the level of adaptation goals, the growing emphasis on holistic concepts of health and wellbeing create a platform for joined up policy.

Adaptation to climate change generally, and actions to minimise health impacts specifically, was seen as largely absent in central government direction to date and limited to district planning legislation and the RMA at the regional level. Without clear direction there is a risk of responding to climate related health impacts rather than anticipating them. Anticipatory adaptation may be perceived as challenging because of uncertainties associated with climate related risks, adaptation benefits, perceived costs of transformational actions and institutional and behavioural barriers that tend to maintain existing resource systems and policies (Kates et al 2012).

Under the RMA structure, National Policy Statements (NPS) and National Environmental Standards are mechanisms for central government to provide direction on a topic, with local government implementing the NPS through regional policies, plans and district planning documents.

Many public administration structures required to enact the suggested policy functions already exist. Important components of those functions include setting and assigning who is accountable, mainstreaming climate change and health in all policies and a non-partisan approach. City and regional councils already have multiple policy and planning documents, into several of which aspects of climate change mitigation and adaptation do, and can, fit.

3.7 Is the system viable?

Looking at likely health and wellbeing impacts of changes of climate there is a role for public health and health care services. For example, managing increases in food borne and infectious disease, or increase in heart disease or allergens from increased temperature. There will be a need to plan for direct impacts on health care service capacity to meet the potential demand resulting from climate changes (Table 1). There may also be capability development required, for example in managing exotic or climate sensitive diseases.

Planning for potential impacts on health infrastructure would be the responsibility of the Ministry of Health and DHBs. The current development of a National Asset Management Programme for DHB assets may usefully consider impacts of projected sea level rise, increased heat and severe weather. The plan might also be expanded to consider health infrastructure owned by private, primary health and Māori led organisations.

In addition, community engagement, community development and wellbeing initiatives should not be separated from local government climate adaptation and mitigation (Simon et al 2019).

Table 1: Examples of direct and indirect functions that support climate change adaptation for health and wellbeing outcomes

	Direct health impacts and health service response		Indirect health impact and health service response		
Inputs	**Health Care Services**	**Public Health Services**	**Public Health Infrastructure**	**Social and Economic Determinants of Health**	**Outputs**
National climate risk assessment National Adaptation Plan Health needs assessment Research Evaluation Intelligence	Primary care Secondary and tertiary services Mental health Disability support Medicines and health technology Health workforce	Communicable disease prevention and surveillance Outbreak investigations Health promotion	Drinking water Hazardous substances surveillance and management Waste management Urban development	Education Employment Housing Access to cultural resources Access to quality natural environments Air quality Food security	Plans Guidance documents for health service providers Adaptive learning cycles Workforce capability and capacity development Mechanisms for inter-agency planning and response.

Increasing requirement for collaborative, cross-agency planning and action

When considering indirect health impacts, such as waste management, housing and urban development, the role of the health and disability sector is less obvious. There is probably a role for public health in supporting a health and wellbeing lens across sectors that can contribute to health and wellbeing outcomes. Such a lens could support mediating the impact of climate change. For example, supporting health considerations in housing design to reduce greenhouse gas emissions and manage increased heat and dampness.

Table 2 provides some examples of activities that could be undertaken to support health and wellbeing outcomes that related to climate change. Which agencies have responsibility for supporting activities should be considered. For example, health impact assessments (HIA) of infrastructure projects within a region would support inclusion of public health risks. While HIA could be conducted by public health units if

resourced, they could also be led by local or regional government, iwi organisations or local NGOs if adequately resourced.

Table 2: Example activities to support adaptation to climate change for health and wellbeing outcomes

Health Care Services	Public Health Services	Public Health Infrastructure	Social and Economic Determinants of Health
Heat Health Guidance Review flooding response guidance and process Review wildfire response guidance and process Health service infrastructure review (building and facilities at risk under climate scenarios)	Review public health surveillance system to ensure meets likely future needs	Support consideration of climate scenarios in water management plans Continue work supporting health input into urban development	Support Health in All Policy approaches within national level planning processes Support development of regional/local planning processes, to ensure health lens included. Support leadership of Māori in national and local planning processes.

For a climate change and health adaptation system to be viable, the health sector will need to ensure that the functions described in this section are in place. The system will need to have the right balance between centrally led Government and regional and local action, and the two and must be capable of dealing with the complexity of changing climatic conditions and how those might impact on human health and the health care system. A viable adaptation system that has flexibility, awareness and self-reliance will have the capacity to anticipate, prepare for and induce change in other systems in pursuit of adaptation goals. The sustainability of health systems is put at risk if the upstream determinants of health and wellbeing are also not considered with regard to climate change (WHO 2019).

4. Actions for consideration

Stakeholder perspectives from both central government and regional agencies provide useful direction for climate change adaptation planning for health. This section provides actions for climate change and health adaptation planning based upon stakeholder perspectives and international literature. In addition, it builds upon previous work on the purpose and design of a Health National Adaptation Plan for Aotearoa New Zealand.

One – Develop a health national adaptation plan

On one hand, reviewing HNAPs and health parts of NAPs from other countries raises a question about the value of an HNAP. The documents are often light on detail. They signal what is hoped to be achieved, but little about what types of actions will take place, where responsibility for action lies, how they will be resourced, and what monitoring and evaluation will be established.

On the other hand, regional stakeholders were clear that direction is needed from central government to determine the priorities for climate adaptation for health; as well as agency responsibilities and resourcing. Also, the Climate Change (Zero Carbon) Act 2019 provides a framework for National Adaptation Plans. Therefore, we suggest that an HNAP is developed that provides direction and detail to central government and regional agencies, as well as aligning with the National Adaptation Plan processes. We suggest that 'enabling' policy identified from regional stakeholder interviews is central to the HNAP development.

Types of issues that could usefully be clarified within an HNAP include:

- how health is being defined in relation to impacts of climate change and opportunities for health impacts of adaptation
- how a climate change and health adaptation plan interacts with other sector climate change adaptation plans
- the role of central and regional agencies, within health sector and wider, for contributing to climate change adaptation planning for health
- articulation of the legislative and regulatory framework to support climate change adaptation for health impacts
- short- and medium-term priorities for action, and resources available to support these priorities
- short, medium- and longer-term monitoring arrangements to 1) understand what climate change adaptation activities are working, where, for whom and why; 2) identify changes in climate change related risks and opportunities for health.

A number of the points raised here for inclusion in a HNAP are considered in more detail within the suggestion actions below.

Two – Te Tiriti of Waitangi led planning

The Climate Change (Zero Carbon) Act 2019 directs that the National Adaptation Plan should consider effects of climate change for iwi and Māori. A clear message from both central and regional agency participants went further than considering effects for iwi and Māori. The message was that partners in Te Tiriti o Waitangi should be actively involved from the beginning of the process of risk assessment and adaptation planning, as well as ongoing monitoring and adaptive management.

The principles described in Waitangi Tribunal report (section 5.1.5) suggest that the HNAP should consider processes for governance over adaptation activities that might include selecting priorities for action, determining what adaptation planning should aim to achieve; resources to support action; connecting up iwi and hapū with national level oversight and planning. Importantly, establishing mechanisms between treaty partners will be an important element of creating the HNAP. While the mechanisms will likely align and utilise those developed for the national adaptation plan, there may be additional processes considered to engage with Māori networks of health providers and professionals.

Three – Supporting wellbeing and population health

The Climate Change (Zero Carbon) Act 2019 directs that the National Adaptation Plan should consider **economic, social, health, environmental, ecological, and cultural effects of climate change, including effects on iwi and Māori**. A clear theme from participants was a preference to view health in a holistic way, with wellbeing often mentioned. Holistic concepts of health and wellbeing will likely integrate considerations across economic, social, health, environment, ecological and culture.

Holistic health and wellbeing may align with Māori concepts of health, such as Pae Ora[3]. Wellbeing also aligns with local government responsibilities to promote **the social, economic, environmental, and cultural well-being of their communities, taking a sustainable development approach** (Local government (Community Well-being) Amendment Act 2019). Wellbeing also aligns with the Living Standards Framework developed by the Treasury[4] and holistic health and wellbeing aligns with the population health and equity focus suggested in the Health and Disability System Review. In that review population health is defined as:

[3] https://www.health.govt.nz/our-work/populations/maori-health/he-korowai-oranga/pae-ora-healthy-futures

[4] https://treasury.govt.nz/information-and-services/nz-economy/higher-living-standards/our-living-standards-framework

> ‘Population health is proactive in promoting and protecting health and keeping people and populations as healthy as possible. It recognises that the health of populations is shaped by the social, economic, cultural and environmental contexts in which people live, learn, play and work, and that responses are required across the health and disability system and other sectors to create environments that support health and wellbeing’ (Health and Disability System Review, 2020: p.15).

A number of implications arise from an explicit aim to support holistic health and wellbeing within a HNAP:

- the focus of a HNAP should include factors across natural, physical, social and economic environments that support health and wellbeing
- processes and resources related to climate change adaptation should support Māori tino rangatiratanga and mana motuhake
- health care service adaptive capacity and resilience remains important
- communities should be involved in planning and implementation, as communities are the sites where the multiple influences on wellbeing meet
- the health and disability system, at central government and regional levels, must work collaboratively to achieve positive health and wellbeing outcomes
- understanding where the health sector leads, as well as where and how it supports others.

Four – Enact enabling policy

The approach to adaptation planning and action for health and wellbeing should be enabling, rather than prescriptive. That is, while key risks to health and wellbeing identified in the national risk assessment are a consideration for adaptation action, the HNAP should go beyond addressing only these risks. Given the recommendations above, the HNAP should consider:

- how iwi and Māori are involved as partners
- how communities are engaged
- how multiple agencies are coordinated around shared goals
- the interaction between policy and evaluation at regional and central government levels
- how a central government policy sets direction and **enables** local action.

Features of enabling policy identified through stakeholders include:

- clear goals and objectives for adaptation that support health and wellbeing outcomes
- clarity about roles and responsibilities of multiple agencies.

- clarity about the legislative frameworks under which agencies operate and how they may work together to achieve goals and objectives
- adequate resources for collaborative planning, implementation and evaluation
- principles for operating and local decision making, rather than prescriptive actions.

Enabling policy recognises that action to support, for example social cohesion, may look different for different communities. It will recognise that much action for health and wellbeing may be led outside of the health sector. It will also recognise that both adaptation and collaboration are currently often not funded activities for agencies.

Five – Provide a clear role for health sector and health care services
Adaptation goals focused upon positive health and wellbeing outcomes across multiple determinants of health. They imply that the Ministry of Health and the health and disability sector will not lead all adaptation activities. In developing a HNAP, there should be clarity about what functions do sit with the health and disability sector, and which do not.

Both central government and regional stakeholders considered the boundaries of a HNAP should include activities related directly to health care services, and activities that support health and wellbeing indirectly – social, economic, environmental and cultural determinants of health.

There is likely to be a role for the Ministry of Health and other agencies within the health and disability sector to ensure participation in other climate adaptation activities such as evaluation, intelligence and learning that is undertaken and shared across the system. In particular, because the suggestion is to enable local flexibility in action to meet particular needs, learning what works, in what contexts and why is important for improving the quality of activities and maintaining viability of the adaptation system.

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Appendix A: Detailed central government and regional participants findings and discussion

This section presents a more detailed discussion from both the central agency workshop and the regional interviews and workshops. It is summarised by the elements of the VSM and begins with the question asked of participants on what they thought the health impacts of climate change might be. Their views were then sought on:

- what the boundaries of a climate change adaptation system for health are
- operational functions are required
- coordination functions are required
- intelligence functions are required
- control functions are required
- policy functions are required.

Due to the nature of the regional interviews, more detail was collected and is therefore discussed from interviewees compared with workshop participants.

A.1 Health impacts of climate change

For understanding the current context, both the central government agency workshop and regional interview participants were asked about what they considered to be likely health impacts of climate change, and what climate change related activities they, and their organisation, are currently undertaking. This section summarises the health impacts identified from central (in bold) and regional participants (Table 1). The health impacts were assigned to pathways by which climate change affects health, and concurrent direct-acting and modifying (conditioning) influences of environmental, social and health-system factors as demonstrated in Figure 1.

Most participants identified changes in environmental and social conditions (determinants of health) as a result of changing climate conditions eg, power, infrastructure, land use. Many of these conditions relate to direct and indirect health exposures such as extreme weather events (direct) and water safety and supply (indirect). Specific health effects were less likely to be described but were implied, such as diseases associated with insect vectors. Health system impacts were also identified, some related to emergency events, others were more nuanced, such as medicine adherence and effectiveness during heatwave events.

Table A1: Health impacts identified from central (in bold) and regional participants

Environmental Conditions	Social Conditions ('upstream determinants of health')	Direct Exposures	Indirect Exposures (changes in water, air, food quality, vector biology, agriculture, industry)	Health system impacts
• **Power/electricity supply/lifeline utilities** • **Housing quality** • **Wildlife, kaimoana, native species etc)** • **City infrastructure (eg, sewage, potable water supply)** • **Land use** • **Food security, rāhui** • **Urban design** • Location of new and existing buildings and building condition (homes and businesses) - too hot or too cold • Changing landscapes/environment • Food quality and availability/security • Loss of infrastructure, assets and services eg, landfills, development, treatment plants, roads, marae • Poorer air quality • Relocating communities	• **Finance (e.g., impact of rates increases on whānau/communities)** • **Animal welfare (companion and production animals)** • **Community resilience** • **Equity** • Loss of whenua and connection from places of wellbeing • Reduced ability for cultural practice (e.g., mahinga kai) • Widening of health inequities particularly for Māori • Impact on workforce (productivity) • Economic impacts (eg, farming, animals)	• **Flooding** • Increased temperature, variability in weather events and hazards (eg, storms, storm surges, flooding, more water, drought, fire, heat impacts/heatwaves, cold events, wind, coastal erosion)	• **Water safety and supply** • **Psychosocial** • psycho-social impacts • mental health • Sea-level rise and wellbeing impacts (including for Pacific peoples) • Changes to communities and existing vulnerabilities in relation to health • Vitamin deficiency and lack of sun • Increased allergies • Eco-anxiety • Drinking water supply, quality, security and resilience (turbidity, salinity, contamination, drought, demand, rural areas) • Increased insect vectors (local and exotic) and diseases associated with vectors (arboviruses), diseases in animals, tropical diseases, change in potential disease states • Migration (climate refugees from the Pacific and Australia) and implications on health services, transport etc	• **Health sector infrastructure and workforce** • **Emergency medical supplies** • **Emergency replacement housing** • Medicine adherence and effectiveness

A.1.1 Regional climate related health impacts

This section describes the climate related health impacts that were either being observed or anticipated by regional participants. Interviewed participants were able to describe in more detail the links between climate change and the determinants of health, such as housing (especially the need for warm housing), food security and the wider environment, links to mental health and wellbeing. Others described some key risks associated with climate change that could be connected to health, such as coastal erosion impacting on housing, mental health or health infrastructure. One interviewee did not think that the key challenges of climate change and health were well understood. An example given was around heatwaves:

> ‘They are not having a huge health impact, but we don’t really know, and that’s the problem because we are not really measuring it.‘

Changes in climate were considered to be currently affecting indigenous people. Some participants noted active considerations regarding moving marae because of changes in land elevation and sea level rise. Health challenges were also considered different between Māori, Pacific peoples and non-Māori.

For Māori and Pacific peoples, the impact of climate change on sea and land were described as directly linked with cultural practices and wellbeing. Cultural practices included access to marae, changes to mahinga kai and shifts in practise that can uphold the health of whenua and wai (water).

> ‘What occurs for the whenua, mahinga kai practices, adaptation that Māori will need to maintain a connection to who Māori are and the way they do things, also in relation to how Māori do adaptation.’

> ‘Knowing the changing of the landscape and using the metaphor of Te Kāinga Rua (second home) there is a loss that is connected to that changing landscape’.

> ‘So coastal low-lying marae may flood, or slips, not just loss of place but destruction of capital assets because they are coastal’.

Several participants discussed the importance of including iwi/Māori in defining impacts of climate change and designing adaptation. Without the active voice of iwi/Māori, there was a view that adaptation efforts will not meet the needs and support wellbeing for iwi/Māori. This also applied to wider Pacific territories in particular the Cook Islands, Tokelau, Niue and Ross Sea dependency and how Government policy in the climate change space related to Māori development, Crown-Iwi relations and foreign affairs.

Infrastructure was another important concern. For example, the relationship between healthy buildings and long-term planning for buildings was considered important for some:

> ‘Our buildings are not cut out for hot days. Certainly, we can see productivity go down when we have hot days. [We are] still building new buildings without thinking about the future of climate change, just build to what is already legislatively in place’.

> ‘[There is a] new build that is being built on a flood plain and just a few feet higher than where a flood would reach.’

A key challenge identified was communication around what is understood of the health system and of the health impacts of wider climate change by decision makers and those within other parts of the health system. Regional workshop participants added that COVID-19 had helped people to understand the role of public and environmental health whereas before this event, health was not widely acknowledged beyond clinical care (hospitals and clinical health).

Regarding communication of health issues within the health system, one participant stated:

> ‘Heat impacts on medicine adherence. Pharmacists also need to know about how climate change (eg, increased temperature) might affect how medicines work. For example, what happens if you are really dehydrated and you are taking medication.’

Other communication issues arose around the national climate change risk assessments that were being conducted. The health sector appeared to be underrepresented in those discussions and some interviewees thought that this potentially might be indicative of what was happening with other non-health agencies.

Climate change was also noted to impact on the environment, leading to potential health impacts associated with drinking water, water borne diseases and contamination.

> ‘Water is already over allocated and water supplies are becoming increasingly contaminated because of the drive on water use and that isn’t going to get better it is going to get worse, so where do we go with that.’

> ‘Before it was about bugs in water but now it is water demand, intensification how does that make sense when we have predictions of more droughts and an increase of population’.

> ‘Pretty much any system or disease is going to be impacted by climate change.’

There was recognition of wider, interconnected challenges in addition to climate change and health impacts. They included how the economy and education could play a key role in supporting adaptation activities and the wider public understanding of climate change issues. The economy was considered as an enormous challenge with direct and indirect impacts. For example, in some geographical areas there remains sizable economic activity based upon extraction of fossil fuels. This works against efforts to mitigate climate change and has a negative effect on the wellbeing of communities. With primary industry, increasing temperatures may also create heat stress in animals, impacting on animal production on which our primary industry depends upon and we an unknown health implications.

> ‘All those dairy farms and how we farm in NZ and as the temperature rises what does this mean for animal disease?’

Some organisations were planning for climate change because they were aware of likely impacts. For example, one participant reflected on heat related deaths in the northern hemisphere and realised that they also needed to plan for this in New Zealand. Another interviewee had noticed current impacts of climate change on the coast and an increased frequency of major weather events.

> ‘You always had the slips and floods because it rains a lot, but the frequency of these large weather events has been dramatic, [including] ex-tropical cyclones with major devastating consequences’.

A.1.2 Current climate change related activity

Within the central government workshop, some participants noted active work in developing adaptation plans. However, the majority indicated little substantive work had yet started, with expectation of future work aligning with national risk assessment and national adaption plan processes being led by MfE. When the workshop was held, the national risk assessment process was yet to begin. Cross-over with emergency management and civil defence planning was noted, with several participants connected to this work.

At the regional level most of the participants had an awareness of climate change and were active in planning for climate change. Mitigation was more commonly referred to as a climate change activity and often considered similar to sustainability. The activities and level of engagement in climate change planning were dependent on the organisation type, size and their respective roles and responsibilities. For example, one organisation was very active in planning for climate change because its responsibilities lay strategically across urban regional planning and hazard risks.

Other participants described their organisations as being in the early stages of thinking about climate change planning, but adaptation was not specifically considered. One participant commented that their organisation was waiting for the direction to come from the national level. Another organisation was interested in climate change planning, but was not quite sure what direction it should be taking in the adaptation planning space:

> 'If there were things [the organisation] could do around adaptation they would like to do them, but they just don't know what they could do'.

The organisations identified as most active in climate change adaptation activities were local and regional government. Local government has established ways to collaborate in that space across regions and the DHB were mentioned as being involved in health planning for climate change more generally. It was also believed the DHB were working on climate related issues such as heatwaves, messaging and communications.

There were some participants that did not know of other organisations working on climate change and health adaptation planning. For some it was not clear what the specific roles or responsibilities were for those involved in health adaptation planning.

> 'I do not know of anything else happening in [the region] in relation to health and adaptation apart from one person working on heat waves'.

A.2 Goals

In designing a climate change adaptation system for health, the intended goals of the system need to be articulated, as goals will influence how boundaries of the system are thought of, as well as informing how success is assessed. The following sections describe what participants thought the goals of adaptation for health should be.

A.2.1 Central government goals

The key insights about goals identified by central government participants were:

- Treaty partners need to be engaged early in the development of an adaptation system
- adaptation planning needs to take a long-term view and yet allow flexibility
- there appears to be a gap in how communities can play a key role in adaptation planning including areas to support active participation, wellbeing, resilience, equity and how that would be resourced.

Most of the goals identified related to adaptation or resilience planning. This planning needs to respond to diverse needs, reduce inequities, recognise the rural / urban divide, promote joined-up planning across all levels, enable a dynamic response that takes a risk response approach, allow flexibility in activities, prioritise risks and different frameworks and extend to a long-term view (50+ years). Adaptation planning needs to integrate tangata whenua, consider changing the way communities are structured, and include community led adaptation planning. This planning needs to ensure that there are sufficient resources for engagement and active participation from communities, across agencies and across local and national levels.

A.2.2 Regional goals

The goals described by the regional interviews were themed and are explored in more detail in the following sections.

A.2.3 National versus regional level goals

One discussion point was whether the goals should be the same at a national and regional level. Interview participants generally thought the goals should be the same but adapted regionally.

> 'I think the goals should be the same, perhaps if you were doing health impact assessment… that would perhaps identify some different regional issues, like I said take drinking water, your issues are going to be different for [different regions] … and so your plan would have to change... Those messages would have to be tailored, but the goal at the top would be the same'

Some participants were particularly concerned that goals for communities should be defined by those communities, particularly for iwi/Māori and hapū.

One participant described complementary goals, where central government takes a 'helicopter view', planning for large-scale events, whereas individual DHBs need to be focused on their own geographical areas. Another participant identified equity as a goal. The Ministry of Health's definition of equity recognises that 'people have differences in health that are not only avoidable but unfair and unjust. Equity recognises different people with different levels of advantage require different approaches and resources to get equitable health outcomes[5]'. For equity reasons they considered that at a local level the focus should be on looking at the 'at-risk' communities, while nationally the focus should be on the funding of adaptation. This is especially so for communities that need to move because of coastal erosion arising from climate change.

[5] https://www.health.govt.nz/about-ministry/what-we-do/work-programme-2019-20/achieving-equity

A.2.4 Community health and wellbeing

Several participants thought that a key goal of adaptation planning for health was good health and wellbeing for communities. One participant talked about having accessible healthy food, clean water and rivers in which people can swim. Wellbeing related goals included community health, and environmental concerns. Health was considered to be wider than direct physical health and health care services. Having alignment between different agencies in understanding what was meant by "good health and wellbeing for communities" was encouraged by another participant in order to achieve these goals and avoid unintended negative consequences for different communities.

Another participant suggested that goals could focus on likely health impacts. For example, the thresholds at which heatwaves create health effects will be different in New Zealand from the thresholds in other countries, but New Zealand thresholds have yet to be determined. Looking at what other countries have done could prove helpful.

For iwi, one participant identified a goal around climate change and health adaptation planning as "upholding optimum health", but they also pointed out that equity targets for Māori have yet to be met in our current climate:

> '…around future proofing systems of response to uphold optimum health even through changing climate and landscapes, bearing in mind we still haven't met equity targets for health outcomes in our current climate'.

The participant also said that the key is to have layers that involve localised communities in planning, and to have the flexibility to have a national view but also being able to respond to localised nuances. They noted that we need to identify communities that will be most affected in order to prepare them for conversations around adaptation:

> '…who are the communities that will be the most impacted, where are they, what are the conversations around adaptation look like for them. How do we prepare communities for those conversations?'

Within health organisations, there was an evident tension between (1) the need to prevent ill-health through design and investment in infrastructure, (2) current relationships and networks, and (3) investments between planning for longer term health gain whilst maintaining the current health system. Here there is more alignment with local government and iwi goals. On the other hand, health care services are under pressure to meet existing demand, which limits resources and their ability to focus on climate change mitigation and adaptation.

> ‘[Climate change and health adaptation] is a low priority, we are in deficit everything is about patient care, it is really hard when dividing up the money, do we build a greener building or do more operations?...It is really hard to prioritise the environment over people’s treatment’.

A.2.5 Health leadership

Health sector participants identified a lack of guidance from the Ministry of Health on goals for mitigation or adaptation related to health and climate change. It was not clear to participants what the co-ordination function of the health and disability sector to climate change and health adaptation was nor what influence the Climate Change (Zero Carbon) Act would have.

Another perspective was that a goal of both adaptation and mitigation should be to secure immediate action. The participant suggested that the longer it takes to implement changes, the more effort will be required to achieve goals related to greenhouse gas reductions, as an example.

At a regional level, it was thought that more health leadership was needed to enable climate-related adaptation planning. Commitment and policy sign off from central government and sharing planning across sectors could be a good solution, as could ensuring that other health determining sectors were considering impacts to health from their climate related decisions. The question was raised as to who should lead health adaptation planning, as it requires capacity building, a shared language and an understanding internally and externally all of which need to be scaled up. Workshop participants supported policy commitment towards addressing climate change in council long-term plans that support health outcomes. Suggestions were also made that would support health leadership

- use a wide lens such as HiAP (health in all policies) to achieve equity and environmental outcomes
- introduce a wider definition of health including all health determinants
- co-ordinate and collaborate between agencies and sectors with a shared vision/goal
- look upstream (eg, housing, improved socioeconomic status) from prevention to mitigation
- select actions that achieve both mitigation and adaptation
- widen public understanding of health to cover wider wellbeing eg, sustainable development goals.

A.3 Boundaries of a health adapation system for climate change

At both central government and regional workshops, participants were given a range of climate-related scenarios to consider and determine whether those scenarios fell inside or outside the scope of what participants viewed as climate related health adaptation activities (Appendix B). Boundary scenarios help identify what participants think are key characteristics (functions and features) of an adaptation system even if those functions or features may not necessarily be led by the health system itself. It may also identify roles and responsibilities that connect or intersect with adaptation goals.

In general, central government participants thought most of the scenarios were in scope for a health adaptation system. Areas that participants thought were least likely to be in scope were scenarios 4 and 5. Scenario 4 described council infrastructure planning to reduce risks from sea level rise, increased rainfall and drinking water contamination. There were five participants who were unsure whether this was in, or out, of scope. Water was considered by the majority of participants as one of the most important health determinants because of the potentially large consequences for public health (eg, flooding and drought). Scenario 5 resulted in an almost 50:50 split with three participants undecided. This scenario described urban areas being supported to increase urban forests as carbon and heat sinks. Comments were specifically around how greener spaces can improve wellbeing. Other participants felt this was not the focus of health, and health needs should be prioritised. For those scenarios considered in scope, participants were not sure which would be the strongest agency to lead scenario 3 – relocating urupā and scenario 6 – economic development activities and increased biodiversity to reduce risks. There were many comments on scenario 7 - increased public health capacity building. Public health was seen ‘as being the people on the ground that will lead at the local level, work with other agencies and can deal with unexpected health impacts’.

For regional participants, almost all scenarios were considered in-scope with climate related health adaptation activities. This was because the scenarios were considered to be business as usual (eg, workforce capacity building, infrastructure planning), health protection (protecting vulnerable populations), or had clear health benefits. One participant mentioned that perhaps perspectives on some of the scenarios had changed because of the recent coronavirus pandemic. They mentioned that public health challenges arising from measles had been much more challenging before the pandemic.

Scenarios that were not considered in-scope or that were difficult to determine were due to the difficulty in placing them in-scope because of their unknown impacts on health. As with the central government workshop, participants could not determine whether biodiversity (scenario 6) should be in scope for climate and health

adaptation. It was suggested that there could be links to mental health as well as the unknown contributions to health from the discovery of new medicines.

A.4 System 1 Operational Functions

Within the VSM, operations are the functions that produce an output. An output may be a service, a product, or a process that enables services and products such as health surveillance systems, planning or budgeting. Operations should be viewed in addition to normal public health and health care delivery.

A.4.1 Central government operational functions

During the central government workshop, the identified operations related to two scenarios: flooding and heat health. While several of the operational functions may be relevant to other climate change events and health risks, they should be read as examples of operational functions required to maintain and improve health and wellbeing. A number of observations were made about the organisations where operational functions reside.

- Several operations functions are led from outside the health sector e.g. district planning, lifeline resilience, catchment management planning, community engagement .
- Most identified operations are conducted at local government or regional government levels e.g. district planning, housing quality management.
- A number of operational functions are already undertaken within district planning and emergency management operations. However, they may not currently be performed with consideration of climate change adaptation requirements or with health and wellbeing goals.
- Operational functions directly within health sector control include emergency preparedness and capacity to respond; workforce infrastructure and training; health education, health care facilities planning and resilience.

A.4.2 Regional government operational functions

Regional participants were asked what types of operations they thought were needed for climate change adaptation for health.

Seven themes related to operations are presented in the following sections.

Leading by Example

While not a specific product or service, there was an idea that taking action on climate related activities (eg, mitigation) would in itself support further action across a

wider range of organisations. Some activities focused upon mitigation and sustainability, were also considered relevant to adaptation:

> '…if we are going to be encouraging people what to do then we need to reflect the same. Others will ask what are you doing? How does that translate into your workplace?'

In the sustainability space many organisations are already active. Activities include composting, electricity audits, transport planning, promoting cycling, improving buildings, new buildings, heating, recycling, use of space and light, technology, gardens, going paperless. There was also a level of frustration from a desire to do the right thing, eg, adopting electric cars, but being constrained by high costs, or legislation not supporting the right decisions.
For example:

> '…project managers are external, so don't buy into the idea of environmental credentials, it is regarded as just another level of scrutiny and therefore avoided.'

> 'How do you operationalise a commitment to reducing carbon emissions as well as any kind of adaptation things that you are doing? They [the organisation] need to be in the prevention business still as well as the adaptation, they should be doing both.'

Applying Health Impact Assessments

An operational function suggested was to run a series of local risk assessments or health impact assessments (HIA) focussing on vulnerable communities, populations, (young children, older persons, low socio-economic, ability to adapt). It was emphasised that such tools were accessible nationally and that there needed to be capacity and implementation resourcing available to other sectors.

> 'There have been some discussions around which communities would be impacted more and it would be good to do some more activities around that including vulnerable populations but there is still work to do around that, regionally bringing concepts together, health promotion, health protection, working together with partners (councils), they [the organisation] can't do their activities or plans without them.'

> 'If NGOs could access funding, they could do some of that work, but it needs to be resourced, but lots could be achieved.'

Alternative heating rules were a good example of how to use a HIA to direct a strategy that incorporates health and wellbeing. A HIA was applied to the region's new air plan and there are now strategies that incorporate health and wellbeing

considerations in the plan. This concept could also be applied to climate and health related issues and used for prioritisation exercises. For climate related impacts, an example of applying a HIA to examine the management of exotic mosquito establishment was given and using this to connect all the agencies that would be required to develop an adaptation plan.

Supporting Mental Health Outcomes

Mental health was commonly identified as likely to be affected by a changing climate. Service responses to support positive mental health were identified as a need, led by the health sector, but supported by multiple sectors. The term 'eco-anxiety' was used by more than one participant. Wildfires in Australia and hurricanes in the USA were given as examples of increased climate stress (from seeing these images). There also appears to be some evidence that police are spending more of their time on suicide call outs, suggesting that mental illness is an increasing health issue (regardless of climate change), which presumably could increase in the future in response to the effects of climate change.

Improving Communication, Messaging and Connectivity

The need for two-way communication of the impacts of the effects of climate change on health between communities, stakeholders and, wider climate change decision makers and those within other parts of the health system, was identified in the central government workshop. This includes (1) having access to accurate information eg, looking at climate related health risk assessments, communities at risk and what actions need to be taken to support adaptation to those risks; and (2) broad approaches to communicate impacts and adaptation options (including monitoring and evaluation) targeted towards different communities or secondary settings but with care and consideration of how the information is delivered.

Good, flexible communication, messaging, monitoring and evaluation of the communication messages was reiterated as an important key activity:

> '…there is no such thing as over communication. Learn how to be a warm communicator as the Government often comes across as cold'.

> 'If our peer supporters and our clinicians have the right reassuring messages then it will reassure those who are experiencing climate distress'.

This messaging expands into awareness. This includes awareness of Pacific peoples who are likely to experience climate distress from rising sea levels inundating their islands of origin. A connected conversation across agencies of response, with communities, is also desirable and a non-siloed response with clear roles in terms of which areas agencies are responding to what:

'…we should be having those conversations before that acute [health] need comes up so that we are not responding to a crisis'.

Applying Legislation

Some interviewees described applying existing legislation as a key activity (Appendix C. The local government Act require councils to deliver services that protect the health and wellbeing of their communities, eg, the provision of drinking water, wastewater removal and treatment, recycling and the removal of waste products and promote community well-being. In addition, the living standards framework[6], focusses on promoting higher living standards and greater intergeneration wellbeing.

Health and disability legislation was also mentioned as it includes a clause on environmental issues. Health (and safety) may also be considered in the RMA, Civil Defence and Emergency Amendment Act (2016)[7], and the Food Act (2014)[8]. Links to legislation are further explored under policy below. Discussion of existing legislation highlights that much of business as usual activity of organisations, such as local government, already considers both environment and wellbeing. Therefore, increasing adaptation activities for health impacts may require a small alteration to the analytical lens, rather than wholesale adjustment of policy and operational settings.

Education and Training

Some participants considered that the general public through to University level and even some councils required more understanding of the links between climate change and health. At the regional workshop it was suggested that senior roles needed upskilling to support some of the climate and health related issues that were being discussed. The Ministry of Education has introduced a climate change for schools' programme so that schools could become involved in building the personal resilience of their pupils. Universities are teaching climate change modules in some medical/health degrees.

Other sectors are looking into mental health impacts including national suicide prevention training to support actions to reduce eco anxiety by developing community-based trainers. The regional workshop participants also suggested that the health sector (DHBs) could co-ordinate some education activities such as health impact assessments.

[6] https://treasury.govt.nz/information-and-services/nz-economy/higher-living-standards/our-living-standards-framework
[7] http://www.legislation.govt.nz/act/public/2016/0088/latest/DLM6648809.html?src=qs
[8] http://www.legislation.govt.nz/act/public/2014/0032/latest/DLM2995811.html

Resourcing for Climate Change Adaptation Activities

Participants were more likely to describe their organisation as having resources and work programmes related to climate change adaptation when there was a clear intersection with already mandated and funded activities. Three organisations had dedicated resources for climate change. One organisation focussed resources on natural hazard mitigation and infrastructure resilience although these initiatives were also related to climate change adaptation. One organisation was more focussed on mitigation of greenhouse gases. Only one organisation had resources specifically for health which supported climate related planning (housing/heat), research and public health promotion.

Where dedicated resources related to climate change (or sustainability) did exist, the framing of these were more likely to be related to mitigation than adaptation.

Most organisations in which participants worked did not have any dedicated resource for climate related adaptation. Two organisations had a previously employed a person to work on sustainability, but these roles no longer existed. Organisations with no dedicated resources expressed a desire for that resource. In some cases, there was willingness to work in climate change mitigation or adaptation, but those initiatives were being undertaken in addition to their day job.

> ‘[We] are always trying to squeeze more of what they have got and some specific funding for climate change would be really useful. Something always has to give otherwise.’

> ‘Everybody must be funded or something else must give (economic savings of investment where is best to invest in the long term). Funding for health adaptation should come locally through the DHB or Ministry of Health.’

> ‘With the regional climate change working group all the people representing the different councils will have a climate change remit as part of their job.’
> ‘[Our iwi] have a team that is responding to climate change and were focussed on having conversations a local level.’

A.5 System 2 Co-ordination functions

For a system to remain viable within a changing operating environment, the VSM identifies the co-ordination functions. These function(s) seek to maximise use of resources between operational functions, avoiding duplication. To be effective, co-ordination will support communication and information sharing across operations functions, and between operations and control functions (Figure 1).

A.5.1 Central government co-ordination functions

The central government workshop revealed the following co-ordination functions to support climate change and health related activities:

- Engaging rural communities' such as, rural support trusts, to support wellbeing and mental health resilience
- integrating psychosocial support (following emergencies)
- developing mechanisms/abilities to meaningfully and practically co-ordinate and engage with iwi/hapū/Māori, such as, a partnership approach eg, iwi leaders forum
- integrating civil defence and emergency management eg, all of Government recovery group, NZ lifelines council, national welfare co-ordination group
- integrating national adverse events committees (NAEC)
- supporting animal welfare

A.5.2 Regional level co-ordination functions

At a regional level, both formal and informal co-ordination processes were described. One participant from within the health sector stated their organisation was linking potential climate change impacts on the environment and thus health when considering local council planning activities.

> 'For instance, with developments, they are going to have these lovely ponds or lakes, that is stagnant water and will attract mosquitoes and mosquitoes have become more prevalent in [region], years ago you never thought about mosquitoes ….'

Multiple participants identified a climate change working and leadership group, which emerged from an existing collaborative group formed to support a regional health in all policies approach. That group had hosted a natural hazards working group and produced a report in terms of the region's readiness. A forum consisting of local government mayors across the region was considered important by one participant, but it was thought that the forum doesn't have any official input into the health sector or vice-versa.

> 'They just don't recognise that it is important, they will engage with transport much more so than they will with health.'

While key national organisations, such as MfE and local government New Zealand[9], were identified as nationally connected and active regarding adaptation, gaps potentially existed. One gap was how the national climate risk assessment co-ordinated with the health sector.

[9] Local government in New Zealand consists of 78 local, regional and unitary councils.

Insufficient resources to support engagement in co-ordination activities was seen as a barrier, they included staffing issues, a lack of interest or 'headspace'.

> 'How can [we] tackle climate change, we do not have enough money to run the [organisation] as it is? It all comes down to the dollars and where do we want to invest?'

One participant reflected that increased connection between health and local government had previously been achieved through funding dedicated positions designed to work across both sectors. Funding for these positions had been removed some years ago.

When asked whether there was a specific organisation that **should take the lead** on health adaptation co-ordination, some interviewees were not sure who that should be or whether there needed to be a lead at all. One organisation was waiting for the climate change commission to prepare general climate adaptation guidance and did not want to get too far ahead. Others did not know of any regional leaders in this area, or overarching plans for health adaptation in other regions.

> 'It is really hard to know if there should be a separate agency looking at climate change to bring those conversations together. It covers such a vast spectrum of activities, or is it just setting a really strong expectation at a central government level that individual agencies will work with other agencies and they will have to demonstrate how they have done that.'

> 'If the right instructions were coming from the top, from politicians, there is ambitions within the different organisations to do what they can. Would like to be Government wide, where each minister should address climate change.'

There were numerous views surrounding what good co-ordination would look like. Elements included: knowing who to connect with; resourcing; well documented and organised processes; clear mandate and purpose of coordinating group; understanding context and history of people and places, particularly with mana whenua.

> 'Knowing who is in your neighbourhood (who to co-ordinate with) and having the breadth and depth across to be able to think about who isn't there'

> '[Good co-ordination]…looks intentional, it involves the governance level direction and doing something concrete, like saying we will work together on these things, having targets, having reporting, it's transparent, you are doing it, and it is practical. And you are committed and accountable for doing it.'

> ‘Legislative mandates and ideally funding, capacity building around how to actually be a good partner would enable good co-ordination’
>
> ‘understanding localised nuance and an idea of mana whenua status that was respected across all of those areas as well a leader that people will follow that did not have an agenda and was not organisation focussed’.

One view was that co-ordination should support understanding local perspectives and feeding these up to inform regional and national action.

> ‘There needs to be a national view that is informed by localised conversations**’.**

A partnership group that developed out of a health-in-all-policies approach was noted by multiple participants as a useful co-ordination mechanism:

> ‘it has [iwi], transport, health, regional and local governments, a very tiny secretariat, governance, senior management, technical working group, it meets regularly and is responsible for spatial planning on a reasonable wide scale’.

Another model noted was used in regional water management planning. This involves local groups, where multiple interests are represented and supported by scientists.

One participant commented that legislation to support transport co-ordination and a regional level was ‘changed a few years ago to get rid of all community representatives, no public health representation, no specific environmental representation, no specific cultural representation’ even though these representatives were valued.

One organisation was making the effort to work with other organisations on climate issues but would prefer mandated enduring relationships rather than ‘submitting things’.

Examples of inefficient co-ordination were also given that included duplication of work requested from central government ‘because of lack of co-ordination between the Minister and the Ministry’. .

Although some organisations are already working together, there was some confusion over how co-ordination between organisations occurs. It appears that some important discussions are driven via local government which have an internal climate change working group. It was known that those groups are working on

regional risk assessments that are aligned with the national MfE climate change risk assessment. Both assessments include a human domain that includes health. However, information about the assessments was limited because only two of the interviewees (from a regional and city council) had been involved in them.

> ‘The councils have been doing risk assessment workshops, but they haven’t invited health to those workshops’.

Nationally, one interviewee thought that there was only 1.5 full time equivalent persons in the Ministry of Health dedicated to environmental and climate change issues. They commented that ‘these positions are new positions which is fantastic but not nearly enough’. There was also knowledge that the Ministry for Primary Industries had researchers working on climate change mitigation and adaptation. Overall, across the interviewees there was a sense that a conversation was building around health adaptation planning, some disconnect between agencies and knowledge holders was identified, and a conversation on climate change adaptation (including health) at a national level around health was occurring.

A key challenge was connecting the dots; those currently involved in climate change adaptation planning do not necessarily make connections to health.

> ‘The problem is the Ministry of Health is not seen as a natural partner for other agencies. They are completely siloed off as hospitals and patients, other agencies do not see that there is a role for them in public health.’

> ‘This appears to be an issue for public health units that try get their foot in the door so that health can be represented….discussions focus on risks without thinking about the health impacts.’

> ‘…it has never come up [climate change and health], people have never even said they have an interest in it’.

A.6 System 3 Control functions

The VSM articulates two types of control function for climate change and health adaptation planning 1) allocation of resources required to meet variability of operating environment; 2) monitoring and audit functions across operations to support allocation of resources. Control functions are focused on implementation, guiding collective efforts across operations to achieve policy objectives. The focus here is not on command and control, but agreeing expectations, distributing resources, and sharing information from monitoring across operational functions back into policy decisions.

A.6.1 Central government control functions

At the central government level, participants identified control functions that gave ‘health a greater voice’, which could be achieved by all agencies applying a ‘health’ lens across climate change decisions. In addition participants suggested alignment of control functions between local and national levels (eg, plans, contracts, policies) that will need resourcing to allow health considerations in climate change adaptation.

A.6.2 Regional level control functions

Regional and local government control functions include activities such as air quality plans and water resource management. Local government has a control role under the RMA to conduct land use planning, as well a development of district plans and community needs assessments.

Control functions identified for health and health allied sectors included business continuity planning, life and utility, provision of psychosocial support, climate change and emergencies, risk assessment of climate-sensitive diseases, education and training and prepositioning supplies.

Contributing to local government and RMA decisions was identified as control a function for iwi.

At a regional/local government level participants were asked **where they thought key decisions** for how adaptation to climate change for health are currently being made and where they thought decisions **should** be made.

Some participants did not know where decisions were being made. For example, one participant did not think health impacts from climate change were in anyone’s mind as there were lots of important issues that people had to deal with. Another said there is a willingness to work on adaptation but did not sense any form of local leadership or direction.

Other participants believed decisions were being made at central government level. One participant said they were waiting for the climate change commission to give direction. Another interviewee said they hoped that these conversations are happening at a local level, however they were unsure who the decision makers were in their region. There was recognition from some that iwi are currently considering climate change mitigation and adaptation. It was also noted there are nuances for mana whenua to be taken into consideration, and anyone with decision making powers needs to uphold their Te Tiriti o Waitangi obligations.

When considering where decisions **should** sit in the future, comments can be grouped under two interacting themes. First, central government sets decisions and

interacts with regional government and agencies. Second, the Ministry of Health will set decisions that interact with health and non-sectors.

The majority of participants thought decisions should be made nationally at central government as climate related health is a national issue and will require resources of central government. However, given the cross-sectoral nature of the issues, there was no one clear location suggested for the control decision making. One suggestion was ensuring cabinet had advisors who would be required to join-up decision making. Another participant thought that the State Sector Act reform could be used as a mechanism to create more formal climate adaptation dialogue.

Although most participants thought central government should be making the decisions, a few also thought that while central government was taking the national view and planning for events around the country, individual DHBs need to be focused on their own geographical areas. So, the national level would be identifying what to focus on and at the regional level the focus would be on how to implement central decisions, given expected regional differences in the effects of climate change. It was noted that in order for DHBs to do this, they needed national leadership.

One participant thought adaptation should be built into Ministry of Health projects, by ensuring that each considers sustainability. This was also reiterated by another interviewee who said it should be similar to Health in All Policies (HiAP), in that climate change adaptation should not be the target of every policy, but it should always be considered in every policy.

It was noted that if ‘health’ is viewed as being wider than physical health, and if it is viewed as being determined by wider social, economic and environmental factors, then health is about all sectors of Government.

Audit and monitoring functions are important for control functions, but most focus beyond the performance of individual operational functions and provide a whole system performance perspective.

Most participants were aware of monitoring that provides information on aspects of the environment, incidence and prevalence of disease, and some wellbeing measures. There have been early attempts at monitoring impacts of climate change, but most data are collected for other purposes. It is not clear if data are being used for the purpose of supporting control and co-ordination functions. Understanding change over time was seen as important for monitoring impacts of climate change. One participant suggested that, while changes in the value of environmental indicators can be seen over time, there does not appear to be an associated change

in decisions about activities affecting the environment. This suggests that monitoring is not yet informing control functions.

Monitoring health impacts of climate change was considered the responsibility of the Ministry of Health by most participants, with a supporting role at regional level for public health units. A cautious perspective was noted by one participant, suggesting public health units are not sufficiently elevated within hierarchy of district health boards to support a strong relationship between monitoring and resource decision-making. A role for universities and crown research institutes was noted by one participant.

One view was that iwi/Māori should be leading the monitoring because Māori have a holistic worldview. Therefore, if Māori led monitoring it would be a holistic approach based in te ao Māori. They said:

> 'Because we [Māori] have never separated what is occurring in our water and actually the health of our people and all of those concepts that come with it…just like I cannot talk about health outcomes without talking about education. It's actually a given in the worldview.'

Related to a holistic view, and acknowledging the interconnected determinants of health, one participant felt that central government needed to take a coordinating role of data collection across sectors.

The Climate Commission was mentioned by one participant as the agency that should do the monitoring as well as the State Services Commission. If they did not, they said there needs to be some sort of other stewardship agency to have some oversight.

A.7 System 4 Intelligence functions

The intelligence function seeks to combine information from monitoring conducted under the control function and with a view of changes in wider operating environments. Information is then presented in a way that can support decision making for both policy and control functions.

A.7.1 Central government intelligence functions

At central government level, participants described intelligence functions as:

- data stewardship – use of existing tools/information/data
- collection/analysis/dissemination; accuracy; emergency health threats knowledge gaps; knowledge management
- health impact assessment/needs analysis – to inform planning
- hazard identification/risk assessment– to inform planning

- vulnerability assessment – to inform planning.

Examples of current intelligence functions included:

- characteristics of the local environment
- natural hazards
- social networks/whakapapa
- mātauranga Māori
- transport infrastructure
- statistics New Zealand/integrated data infrastructure
- research from eg, national institute of water and atmospheric research, institute for environmental science and research, the national science challenges (deep south, building better homes, towns and cities), forest and bird,
- places of significance
- impact analysis/vulnerabilities.

A.7.2 Regional level intelligence functions

At a regional level there seems to be a mixture of existing monitoring and intelligence functions:

- DHB reports
- Commission reports
- Treasury reports
- network meetings with external stakeholder groups
- situation reports from civil defence
- general and social media
- health census data
- wellbeing index
- resident's satisfaction surveys
- state of the environment reporting indexes and indicators
- deprivation index.

Some of these functions are useful for thinking about climate change impacts on health whereas other were identified as needing further development to make links with climate change more explicit. It is not clear whether there were any systems in place that could monitor the adequacy of services or interventions for supporting health outcomes in response to changing climate.

Participants were asked where they thought responsibility for intelligence lay. That is responsibility for looking externally at the operating environment (political, social,

legislative, economic, cultural and natural environmental factors that significantly affect the implementation of any co-operation) to support adaptions For this set of questions an assumption was made that, as impacts of climate change increase, there will be changes in health needs and the operating environment for health services.
One participant said that their organisation has an extensive research and monitoring programme. Water and climate change are top priorities as were community wellbeing outcomes.

Another participant thought that more specific data was needed to reflect climate impacts as current systems were designed for other purposes. For example, in thinking about environmental health:

> 'This ideally would also include environmental data, as there are now links between climate change and drinking water ie, water quantity, tracking of bores – salt intrusion, flooding and turbidity issues.'

It was not clear how existing data are used to support health related policy or implementation decision making. For example, it was noted that:

> 'The climate is changing everywhere, and it is changing everything. We are not at the point of knowing which communities are going to have to be moved but they do know there will be. This will impact on GPs, hospitals, health infrastructure etc.'

Some participants were quick to note that in order to monitor critical aspects of climate, health and adaptation, resourcing is required:

> 'Public health needs to have more focus and resourcing; it is very difficult at the moment they are always stretched. The Government needs to acknowledge some of those issues.'

> 'Resources, if someone is expected to do something for it, they have to be paid for it, but anticipating what people need to do or when, it is really hard and how do you put a value on it?'

Another theme was identifying which organisation has responsibility for monitoring, and strategy, when the impact could be health related but not in the health sectors control. For example, who was responsible for climate related impacts on housing or food issues:

> 'One person is thinking about housing but doesn't not think climate change is part of that remit. They don't have anyone currently working on food issues.'

Another interviewee commented that generally the health sector addressed acute issues rather than long-term resilience building and capacity.

Most participants believed that monitoring information should be shared across other organisations and be publicly available.

> ‘Information should be shared for the greater good. There is also a question around who should have responsibility for sharing information?

One organisation thought it was important that monitoring information was clear on who was being represented within a given community and what responsibilities were held with other organisations. ‘Generational thinking’ was also important ‘so that will hopefully always be in play, looking at the legacy’.

From a VSM perspective, information will need to be shared across organisations responsible for delivering operational functions, as well as organisations involved in co-ordination, control and policy functions.

Many participants are already sharing information between local government and DHBs. Two models of sharing and using data were given by interviewees, the police integrated response approach and the use of wellbeing indexes.

> ‘They had the right people and the right agency paying for it, the police paid for all of it but they still had the other agencies involved so having a really awesome lead agency, funded properly and bring the right people in and give it the time is all important.’

There were different views on **how** information should be shared and used.

> ‘Information should be shared via a central repository because the data belongs to everyone and everyone should be able to access it.’
> ‘There should be some grand coalition led by the Crown and [iwi], for the Crown I would have the DHB, local Ministry of Education, Ministry of Health, Te Puni Kōkiri, and key community leaders in a special working group to develop a response to regional climate change. Hopefully it would be meaningful.’

One participant specifically suggested open collaboration using monitoring information for decision making and prioritising the voice of mana whenua.

Collation of relevant information was considered by one participant as challenging. ‘NZ is bit fragmented, trying to get all the information together is tricky.’ For example, ‘in terms of air quality the environmental health indicators are reported nationally but you can’t pull it down to your region. That would be more helpful’.

A.8 System 5 Policy functions

The VSM includes a policy function that defines the goals of the whole system. It is responsible for overall governance and direction. The policy function must work

closely with operational functions, which implement the policy direction. To be responsive to changing operating environments, policy must understand challenges and successes experienced across operations. The connection of the coordinating function, control functions of audit and monitoring, and intelligence functions are key to this policy/operations connection.

A.8.1 Central government policy functions

Central government participants identified some key policy insights:

- all levels of Government to engage on the topic of climate change and health adaptation
- co-design policy consultation, particularly with iwi, DHBs and local government
- use existing levers such as the RMA and national environmental standards infrastructure requests when considering climate related health adaptation activities
- use annual planning guidance for DHBs from the Ministry of Health to include climate change and health considerations
- that stronger direction was required from the Ministry of Health to DHBs, eg, incentives for compliance to do adaptation and accountability structures.

A.8.2 Regional level policy functions

Use of existing policy mechanisms

As described by participants, the health sector is seen as implementing strategic direction from the Minister of Health and Ministry of Health. District health boards Direction receive annual direction from the Ministry.

It was also noted by one participant that the Health Act 1956 gives power to Medical Officers of Health to take into account environment impacts on health. The Health Act also tasks local government with a role in protecting public health (part 2, section 23). The four wellbeing's (social, economic, environmental and cultural wellbeing, present and future[10]) of the Treasury's living standards framework, city council long term plans and the RMA were also mentioned as policy levers.

Given the requirement for local government to consider climate change in decision making, and local government's influence on natural and built environment within a region, several participants described local government as a key actor within regional climate change adaptation. There was little discussion of the adequacy of

[10] Local government Act 2002 (2019 amendment) – Part 2, 10 Purpose of local government (1) The purpose of local government is— (a) to enable democratic local decision-making and action by, and on behalf of, communities; and (b) to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future.

the current legislative framework for local government in ensuring effective climate adaptation actions.

The lack of policy direction from Central government to local government and local/regional agencies, such as DHBs was discussed. One interviewee said there needs to be a separate strategy that is guided nationally by the Ministry of Health. This strategy should look at social, health, mental, education, climate change. They said; 'Unless there is a strategy [for health] we have found that there is no policy'. They also stated that there is a need for an over-arching strategy that other strategies can connect with. 'You can't get politicians to buy into something unless there's a document. It gets their attention.' They also continued and said that the goals in the strategy needed to be achievable and that sustainability within the organisation as well as adaptation needed to be considered. For instance, the organisation should be trying to slow down greenhouse gas emissions to reduce the need for continuing adaptation. While numerous impacts on health from climate change were noted by participants, to date, the impacts of heat on health was the only topic identified for which the Ministry of Health had provided direction.

While numerous impacts on health from climate change were noted by participants, to date, the impacts of heat on health was the only topic identified for which the Ministry of Health had provided direction.

What types of legislation and policy would support adaptation?
Several participants talked about policy (and legislation where needed) as providing important strategic direction for regional and local agencies. It was clear that participants thought such policy should be enabling, rather than prescriptive, allowing for local contexts to be considered. For example, one geographical area was identified as unlikely to be impacted by excessive heat, whereas only four hours' drive away, another area was at increasing heat risk.

What are the features of enabling policy?
Policy expectations from central government require adequate resourcing for local action. Within the health sector, several participants noted the high demand for more health care service delivery. Even within the public health sector~~,~~ public participants spoke of high competition for resources with little capacity for staff to take on additional workloads. Participants suggested that activities directed at adaptation could not be delivered without additional resource.

It was clear that most participants thought central government needed to set clear policy direction, which would support local level policy and activities. Equally clear, was the idea that policy needed to support local variation, with local people being involved in defining problems and solutions. There was a desire that central government direction would reflect issues and priorities from communities. Key

within local community voice is the position of mana whenua, ensuring that adaptation reflects Te Tiriti o Waitangi relationships.

Within the region, climate change was seen as a cross-sector issue, requiring collaborative efforts across local government, environmental management, health, social service agencies and community organisations. While all participants could identify some likely health impacts of climate change, these issues were viewed by most as symptoms of interconnected causes. There was a desire that policy would support intersectoral action and not silo natural environment, built environment and people. Again, intersectoral action needs to be resourced.

> 'When you head is chocka of the narrow thing you are tasked to do you, there is just not enough headspace to think laterally and you are not thinking about who else do I need to be collaborating with to get my job done'.

An enabling policy was also described by some as one that sets minimum standards and expectations, whilst also supporting action that goes beyond the minimum. Some participants talked about the Building Code, Emissions Trading Scheme or the RMA, as examples where policy sets minimum standards expected. In areas, like the building code, the minimum standards themselves need to be changed to support more effective climate mitigation and adaptation goals. However, several participants noted that it is likely efforts will need to go beyond the minimum standards to increase resilience to climate change over time, and that minimum standards will need to rise over time.

Interaction with monitoring and intelligence

Monitoring the health impacts of climate change interacts with policy by identifying issues adaption should consider and the effects that adaptation efforts have had. Most participants considered monitoring should be led by central government. However, it was also recognised that monitoring would be used to support local adaptation activities, so the data needed to be available locally. This mirrors, to some degree, the discussion regarding central government policy that sets direction for local level adaptation action.

Appendix B: Boundaries Sheet

Scenario 1 -Health care services (e.g. hospitals, aged care facilities) have heat health plans in place for heat wave events

Scenario 2 - DHB infrastructure planning identifies and plans to reduce risk to health care facilities vulnerable to sea level risk, flooding, storms and wildfire

Scenario 3 - Hapū are supported to relocate urupā (cemetery) to avoid damage from storm surges

Scenario 4 - Council infrastructure planning reduces risk from sea level rise and increased rainfall and drinking water contamination through sewerage and storm water management.

Scenario 5 - Urban areas are supported to increase urban forests as both carbon and heat sinks

Scenario 6 - Economic development activities seek to diversify types of rural business in order to reduce risk from climate related shocks (e.g. flooding, drought) and increase local biodiversity

Scenario 7 - Public Health Unit capacity to respond to communicable disease (food borne, vector borne, etc) is increased through workforce capacity building.

Appendix C: Relevant Legislation

The Climate Change (Zero Carbon) Act 2019

The Climate Change (Zero Carbon) Act 2019 provides a legislative framework for national climate change risk assessment processes and national adaptation planning.

Under the Act, a national risk assessment must be produced every six years, from which a national adaptation plan (NAP) is developed. The risk assessment must (section 5Zp part 1 a and b):

> 'assess the risks to New Zealand's economy, society, environment, and ecology from the current and future effects of climate change; and
> identify the most significant risks to New Zealand, based on the nature of the risks, their severity, and the need for co-ordinated steps to respond to those risks in the next 6-year period.'

The Act directs the Climate Change Commission as responsible for developing the national risk assessment, and that it must take into account (Section 5ZQ):

(3) In preparing a national climate change risk assessment, the Commission must take into account the following:

(a) economic, social, health, environmental, ecological, and cultural effects of climate change

(b) the distribution of the effects of climate change across society, taking particular account of vulnerable groups or sectors

(c) New Zealand's relevant obligations under international agreements

(d) how the assessment aligns or links with any other relevant national risk assessments produced by central government entities

(e) current effects and likely future effects of climate change

(f) any information received as a result of requests made under section 5ZW

(g) scientific and technical advice.

In response to the national risk assessment, the Climate Change (Zero Carbon) Act 2019 directs the Minister for Climate Change to prepare a national adaptation plan, which (Section 5ZS):

(2) A national adaptation plan must set out—

(a) the Government's objectives for adapting to the effects of climate change; and

(b) the Government's strategies, policies, and proposals for meeting those objectives; and

(c) the time frames for implementing the strategies, policies, and proposals; and

(d) how the matters in paragraphs (a) to (c) address the most significant risks identified in the most recent national climate change risk assessment; and
(e) the measures and indicators that will enable regular monitoring of and reporting on the implementation of the strategies, policies, and proposals.

(3) A national adaptation plan may include any other matter that the Minister considers relevant.

(4) In preparing a national adaptation plan, the Minister must take into account the following:

(a) economic, social, health, environmental, ecological, and cultural effects of climate change, including effects on iwi and Māori:
(b) the distribution of the effects of climate change across society, taking particular account of vulnerable groups or sectors:
(c) New Zealand's relevant obligations under international agreements:
(d) any information received as a result of requests made under section 5ZW:
(e) any relevant advice or reports received from the Commission:
(f) the ability of communities or organisations to undertake adaptation action, including how any action may be funded:
(g) scientific and technical advice.

The Resource Management Act (1991)[11]

Under the Resource Management Act 1991 (RMA) local government is required to consider the effects of a changing climate on communities. It is also required to incorporate climate change into existing frameworks, plans, projects and standard decision-making procedures. A climate change perspective is now integrated into activities such as flood management, water resources, planning, building regulations and transport.

The Quality Planning website has a guidance note that provides:

- an overview of how particular regard may be given to the effects of climate change
- information on expected climate change effects in New Zealand
- advice on methods for considering and addressing climate change effects under the RMA.

One of the changes introduced by the Resource Legislation Amendment Act 2017 is that 'the management of significant risks from natural hazards' is a new matter of national importance in section 6 of the RMA.

[11] Sourced from: https://www.mfe.govt.nz/climate-change/climate-change-and-government/adapting-climate-change/adaptation-and-local-government#:~:text=Under%20the%20Resource%20Management%20Act,and%20standard%20decision%2Dmaking%20procedures.

Local government (Community Well-being) Amendment Act 2019

This act reinstates 4 aspects of community well-being. In Part 1, Section 3 amended, the purpose of the act is:

(d) provides for local authorities to play a broad role in promoting the social, economic, environmental, and cultural well-being of their communities, taking a sustainable development approach.

Appendix D: Interview Questions

Health Adaptation Planning – Key informant interview questions

11 November 2019

ESR in partnership with the Ministry of Health are gathering stakeholder views and expert knowledge to inform health national adaptation planning for climate change. The questions that you answer today, will support the Ministry of Health in developing climate change and health related adaptation approaches; identify key issues and options for climate related adaptation planning for health; and inform adaptation strategy development.
Rather than discussing mitigation or reducing green house gas emissoins, we are focussing on adaptation, or things that we can do to anticipate and reduce the impacts that are expected. An example might be Identification and application of short-term incentives to change behaviours to reduce long term vulnerability to health impacts.
Your participation is crucial for understanding different perspectives and opportunities to address immediate, medium and long term health adaptation to climate change.

Introductory and context questions
Can you tell me about your role here [organisation they work for]?
Is [your organisation] active in planning for climate change?

- Yes – in what ways?
- No – are there any current plans to begin adaptation planning?

Do you know of climate change related adaptation planning for health within the region?
What is your understanding of what **key challenges or impacts on 'health'** are likely to be related to climate change?
[Idea with this question is to think about their response to questions below in terms of what they understand key challenges for health to be]

System goals
How would you describe what the **goals** of adaptation planning for health should be?
Are there different goals at a **national l**evel compared to **regional** level?
What do think the goals of **your organisation** might be?

Operations – system 1 – questions
What are the **key activities or tasks** you think are required for effective adaptation to climate change for health?

- Prompts: eg, within health services; health promotion; environmental health; public health or related social services; urban planning, etc.

What are the **key organisations** you think would be involved in adaptation to climate change for health within the region?
Has [your organisation] dedicated any **resources** to climate change related adaptation or services?
Do you know of any resources within other organisations in the region being dedicated to support health related adaptation to climate change?

Co-ordination – system 2 – questions
Are you aware of any co-ordination on adaptation planning or activities between different organisations within the region currently?
How do you think adaptation efforts should be coordinated?

- Prompt: is there a particular organisation that should take the lead on co-ordination?

Can you describe what good co-ordination would look like?

- Prompt: what would you be seeing happen or not happening?

Control – system 3 – questions
Where do you think **key decisions** for how adaptation to climate change for health are currently being made?
Where do you think decisions **should** be made – which organisations should have responsibility?

- Prompt: can you think about both nationally and within this region?

Do you know of any current monitoring of climate impacts on health?
Do you know of any current monitoring of health system adaptation to climate change?
eg, *how do you know if you are adapting well, enough, in the right way? Who is adapting? Is the adaptation meeting emerging health risks?*
Which agencies do you think should be taking a lead on **monitoring** climate change related health impacts and adaptations?

- Prompt: can you think about both nationally and within this region?

Intelligence – system 4 – questions
[Some of the questions on monitoring under system 3 may also be relevant here]
Explanation:
We are making an assumption that, as impacts of climate change increase, there will be changes in the operating environment for health services, and the health needs.

We are interested in thinking about how we should keep track of changes to the environment and to people, so that our health services can respond.
How does [your organisation] **currently know** if there are changes in social, economic or physical environment that need to be considered for how services are planned and delivered?
What do you think are the **critical aspects** of [your organisations] that should be monitored in terms of the environment that you operate in eg, legislation, physical infrastructure, resources?
Example: if you are responsible for providing a service, and that service is impacted by climate, how would you know things were changing or likely to happen so that you were prepared?
Which organisations within the region do you think should be tracking changes in the environment they operate in?
How should this monitoring information be **shared and used**?

Policy – System 5 – Questions
What policies do you think need to be in place to support adaptation planning for health impacts of climate change?

- Prompt: what policies nationally; what policies within your region?

Who should get to make policy decisions?

- Prompt: what policies nationally; what policies within your region?
- Prompt: which organisations should be involved? Which groups of people should have a say?

How do you think policy can support effective adaptation planning and actions within the region, and for [your organisation]?

Appendix E: Information Sheet

Information Sheet: Stakeholder Perspectives on National Health Adaptation Planning for Climate Change

DECEMBER 2019

ESR in partnership with the Ministry of Health would like to invite you to participate in a project to gather stakeholder views and expert knowledge on **health national adaptation planning for climate change**. The information gathered will help support the Ministry of Health when considering climate change and health related adaptation approaches and strategy development. As health is a cross-cutting issue, your agency's participation and feedback is crucial for understanding different perspectives and opportunities to addresses immediate, medium and long term health adaptation to climate change.

The research will draw on insights gained through:

- interviews with health sector stakeholders from the region
- a workshop with stakeholders from the region

This information sheet relates to the interview component of this research only. Interviews will follow a structured conversational approach to explore issues in-depth with interviewees. The interview will be in person, at a time and place that is convenient to both parties. The interview will take 45 – 60 minutes. Interviews will be audio-recorded (by consent of participants) and kept confidential to the research team for analysis purposes only. Participants can request a copy of their recorded interview and the outcome of the project during the interview or by contacting the researchers listed below.

All reports and publications from this project will ensure that views are not attributed to individuals or organisations without checking with the person and organisation concerned first. Publications arising from this research will include a report to the Ministry of Health and peer reviewed journal articles. A summary of research findings may be made available on Ministry of Health or ESR websites. Participants can withdraw from the study at any time prior to publication.

The research will be conducted by experienced social and science researchers from ESR, a Crown Research Institute.

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Appendix F: Consent Form

Consent Form: Stakeholder Perspectives on National Health Adaptation Planning for Climate Change
December 2019

	I have read and understood the information sheet dated _____ for taking part in the project to gather stakeholder views and expert knowledge on health national adaptation planning for climate change.		YES/NO
	I understand that in written reports, comments will not be attributed to identifiable individuals/organisations unless permission is given.		YES/NO
	I have had time to consider whether to take part in the study, and I know who to contact if I have any questions.		YES/NO
	I consent to my interview being audio-recorded.		YES/NO
	I agree to be contacted again for a follow-up working on climate change and health adaptation planning.		YES/NO

I _____ (full name) consent to take part in this study.

Date: _____

Signature: _____

Science for Communities

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