

Determinants of adaptive capacity for climate change adaptation

Considerations for Regional Victoria
February 2020

Purpose of this report

The research and findings (recommendations) presented in this report were developed by the Griffith Climate Change Response Program as per a request for information by the Victorian Department of Environment, Land, Water and Planning (DELWP) to better understand the barriers to effective climate change adaptation in regional Victoria. This report is a part of a collaborative series of works developed by Griffith University that explores best practice to manage and overcome the barriers to implementation, outlines the determinants of adaptive capacity and critical policy elements for regional consideration, as well as the social and cultural barriers to transformative adaptation success.

This information and advice are designed to be used by decision makers in a government, business and community context to assist with developing plans and priorities for climate change response. This report, and the others in the series, will be integrated with the 'Supporting our Regions to Adapt' program and other programs on theory of change by the Victorian state government.

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1. Scope and limitations

This brief explores the key determinants of adaptive capacity required in 'place' to respond to the impacts of climate change. We address these issues by providing an overview of the theoretical place-based elements that may influence both policy development and the success of implementing climate change adaptation mechanisms. Our discussion considers the themes of collective leadership, collective action and collective impact in decision making and presents a brief international case study to outline the different elements that influence adaptive capacity in practice.

We draw out policy guidance and provide context for exploring the complexities of climate change adaptation in regional Victoria as the impacts of climate change vary greatly depending on the geographic factors of any given community. The impacts of climate change can further exacerbate vulnerabilities and risks for a given community¹⁰. The capacity of a community to mitigate and adapt to such problems are affected by multiple socio-economic, geographic and other physical properties unique to the place of impact. History and culture are key factors that shape how a local

community perceives the impacts of climate change and works to address them. As these systems are all intricately linked, policy action in one context influences outcomes in other domains. All of this is shaped by the way in which the changing climate and adaptation policies are understood and implemented by each community within its regional context^{2,3,19,31}. Policy action must therefore be coordinated across impacted place and people. This coordination can be supported by a system of collaboration between policymakers, a diverse array of stakeholders and communities; as Victoria seeks to adapt to climate change, understanding and leveraging the inter-connection between policy and place will become increasingly important.

Key messages

Our understanding of place is critical for defining adaptive capacity and taking targeted action:

Place is where action happens. The components that make up a place need to be considered and leveraged as key determinants for building adaptive capacity and ultimately driving effective action.

The key determinants of adaptive capacity must be defined and understood in a place-based context:

Economic resources, institutions, infrastructure, social capital or technology alone do not determine the adaptive capacity of a community; the interaction between these determinants and the physical environment of an impacted place will determine a community's adaptive capacity. These interactions can create barriers or enable opportunities to for the development of adaptive capacity. Consequently, understanding and effectively leveraging these resources determines how effectively adaptive capacity can be built and applied.

Partnership approaches are the catalyst for generating local ownership and action:

No single actor, whether government, business or individual, can determine the effectiveness of climate change adaptation. The complexity of climate change, and the diverse array of impacts effects all parts of society. Effectively adaptation to climate change will require the coordinated effort of all stakeholders, with a particular focus on local-level coordination and action. Collaboration and genuine partnership between stakeholders are essential. Collaborative governance approaches that value local knowledge and leverage coordinated action can bring about positive adaptation on a scale that cannot be achieved individually. Through collective leadership and collective impact approaches, local capacities can be leveraged to solve local issues and inform better practices with collective engagement from all stakeholders.

Place-based change requires a long-term commitment:

Place-based adaptation supports long-term change in the impacted place. This type of transformational change requires continuous coordination between multiple stakeholders within communities and across jurisdictions. The impacts of climate change will be felt for generations; adapting to these impacts requires a long-term perspective, supported by a collective impact framework that sustains stakeholder engagement and action.

2. Key conceptual considerations

2.1 Place-based policy and action

Place-based policy ensures the specific geographic, physical and socio-economic systems of a given location are at the centre of policy design and implementation^{1,3,6,31}. Taking a place-based approach provides a lens not only for policy development but also enables a better understanding of how the policy implementation space is affected by the capacity of the government and both business and community stakeholders.

Recognition of the importance of place-based policy approaches has increased notably since the early 2000s. The global focus of policy development has shifted from national, to sub-national, and more recently to an increasingly local approach^{6,18}. These geo-spatial considerations for socio-economic development are at the core of climate change adaptation planning and implementation^{3,22,30,35}.

A critical application of this place-based approach is in designing and implementing policy that supports local communities to adapt positively to the changing climate^{7,28}. This perspective designs policy from the bottom-up, seeking local sources of knowledge and expertise, assessing local impacts and the local capacity to adapt to changes. Most importantly, place-based policy emphasises connecting local stakeholders across the spectrum of business, government and community to work collaboratively to address complex challenges²².

2.2 Adaptive capacity in a changing climate

The novel, complex and cross-cutting nature of climate change problems means that no one sector, or level of society can deal with it. In fact, the challenges and opportunities presented to society by climate change requires wide-spread societal action that is both consistent and coordinated. However, a major barrier to this is that society is not typically organized in a way that easily enables such wide-spread action, which is a major limitation to our adaptive capacity to climate change.

Adaptation is a combination of the processes and practices undertaken to moderate potential damages associated with climate change³¹; the level of capacity to adapt to change will vary across scales and within regions due to different levels of adaptive capacity. Understanding how this capacity is underpinned by various determinants, i.e. what it is founded on and how it can be leveraged, has been a sustained focus of climate change and disaster risk management research for decades. As a result, there is an extensive body of information on how the determinants of adaptive capacity are built, how they interact or influence each other, and the factors that contribute to success or failure in adaptation planning^{29,30}. Therefore, the effectiveness of adaptation activities is dependent on the adaptive capacity within a place and the importance of understanding and building adaptive capacity needs to be a central objective to climate change adaptation policy.

More resilient communities, that is those with greater adaptation capacity, are better able to adapt to problems that arise from a changing environment^{16,21}; the policy challenge therefore becomes how to influence this cycle by leveraging the unique features of different regions.

2.3 Key determinants of adaptive capacity

The determinants of adaptive capacity arise out of a given place and are shaped by the physical attributes that are unique to that location, the functions within the community, as well as how they have developed over time. In the historical sense, this can be seen in certain cities specialising in unique trades based on their access to rare or raw materials, or conversely cities at the cross-roads of major trade routes becoming advanced centres of knowledge. Place has always affected how people live, what they do, and how they adapt to their changing environment.

As our understanding of the impact of place has evolved, there is broad consensus that the ability of a community to adapt, its *adaptive capacity*, is shaped by a set of key factors^{2,14,22,29}. These determinants include; economic assets, technological skills, information and skills, infrastructure, as well as institutional and societal equity.

We have included social capital in our analysis as this determinant, although difficult to measure through official data, is the central 'glue' that holds communities together and provides the storehouse of trust and coordination that enables communities to act together to address complex problems. The conditions under which social capital can explore adaptive capacity relate to the agency, or capacity, of individuals to make 'free choices' and enact decisions independently, with legitimacy and authority^{12,26}. Social barriers to effective adaptation will vary between places but it is widely accepted that for a community or place to be able to take action they will require the presence of key change levers including community motivation, community ability, and community agency¹⁶.

Extensive research in disaster response and recovery emphasises the vital role of social capital in resilient communities^{6,32}.

The precise level of each determinant will vary across scales; between regions, between economic sectors, and even between townships. A community's capacity to adapt to the changing climate is affected by the nature of each determinant and their interactions within the place of identified impact. These determinants all have inter-connected and consequential functions in policy making and implementation. Each of these factors are inter-twined, and can be envisaged as enveloping, interacting and shaping community function as can be seen in Figure 1³⁰.

In an interconnected socio-economic system, the development and application of one determinant can affect others; for example, the impact of enhancing infrastructure is determined by the equity of access to that infrastructure by people in a particular area. Due to the inter-connected nature of these resources, any policy intervention aimed at building adaptive capacity for climate change adaptation must consider the full resource context of any given place; a policy intervention which fails to do so will have, at best, limited effectiveness and a reduced likelihood of successful implementation. An outline of the elements in adaptive capacity and the role they play in assessments of same can be seen in Table 1.

Figure 1: The inter-connected determinants of adaptive capacity

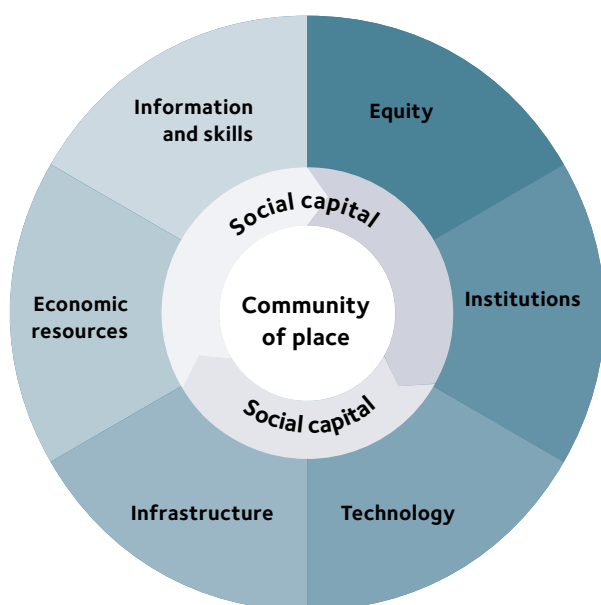


Table 1: Exploring the determinants of adaptive capacity

Determinant	Description	Role
Equity	The nature of access to all resources in society – how fair or unfair this access is.	Underpins the ability of communities to access and apply all other resources. Equity of access to resources is fundamental to a community's ability to adapt to a changing climate.
Institutions	Formal rules —the laws, government, policy and regional/ local programmes Informal rules —the practices, norms and cultures of a community or their social institutions	Interplay between formal institutions and communities can support or impede adaptation; impacts differ depending on community, place and policy sector.
Technology	Hard and soft technology: e.g. high-speed internet, weather monitoring systems, advanced farming methods, integration of advanced technology in daily life	Acts as a supporting resource to other determinants; can help develop and enable access to other determinant resources.
Infrastructure	Transport systems, utility, water and sewerage systems, road systems, housing, farming and forestry systems.	Type, diversity and resilience of infrastructure may influence adaptation options for communities
Economic resources	Economic assets and capital resources	Size and type of resources affect the ability of an economy to adapt to climate change impacts; the ability to diversify and increase access to resources builds a region's adaptive capacity.
Information and skills	May take the shape of local knowledge and expertise, education, or the diversity of skills within a community.	Generates knowledge and awareness among policy actors and communities. Enables communities to lead and determine their own adaptation outcomes.
Social capital	Resource developed and stored by a given social system.	Implementation of policy is affected by the capacity and willingness of the community to adopt changes; this capital will be determined by exploring the community motivation, community ability, and community agency. Enables communities to build trust and work together to address large-scale problems that affect their place of living.

3. Adaptive capacity requirements

3.1 The challenge of building and leveraging adaptive capacity

Adaptive capacity can be a bridge between barriers to adaptation and navigating the social and cultural context in which responses are developed. The determinants of adaptive capacity contribute to the negotiation of barriers to implementation of adaptation mechanisms and also links directly to the resourcefulness of a place, giving insights to the social capital required for success^{12,26}. A lack of capacity to address adaptation challenges (throughout the adaptation process for example) weakens the overall ability of the governance and community systems to be effective.

The complexity of climate change, and the vast array of political, business and community stakeholders involved in implementing adaptation policies, creates a classic collective action problem. Climate impacts cause complex wicked problems leading to unremitting challenges, vulnerabilities and risk for the community. Therefore, the policy actions and capacity to mitigate and adapt to such problems are affected by a multiplex of socio-economic, geographic and other physical properties inherent to their place of impact. In these situations, all stakeholders would benefit by working together to solve issues, yet day-to-day considerations and various financial or policy disincentives make such collaboration difficult to create, and even harder to sustain. At the core of this discussion is the question of adaptive capacity; building adaptive capacity is best achieved by integrating the key determinants throughout the policy process^{22,34}.

When we discuss the determinants of adaptive capacity, a mere weakness may not necessarily create barriers to adaptation; however, a lack of ability to address that weakness can reinforce a more challenging barrier.

For example, economic resources are a determinant, but weak economic resource may not create barrier on its own, adaptive capacity assessments allow us to make decisions that either overcome or reinforce that weakness. If the community fails to address that weakness by failing to utilise available information, poorly managing or mobilising resources, or failing to appoint strong leadership and advocates for success then one determinant (economic resources) can reinforce the weakness in others (Information and skills)²⁶.

Overcoming collective action problems requires leadership at varying scales, a policy development and implementation structure that incorporates numerous stakeholders, and a coordinated approach to implementing solutions^{17,21,32,36}. Taking a place-based approach to climate adaptation facilitates a genuine appreciation of local issues and local adaptive capacity and may enable the creation of structures that support local collective action. Accordingly, this collaboration between stakeholders reduces duplication of effort and helps to facilitate collective action that, together, achieves

greater and more diverse impacts than if individual stakeholders were to act independently. Supporting informed and collaborative decision making across impacted sectors enables regional communities to build adaptive capacity and, importantly, leverage this capacity to take coordinated action to address climate change in their local area^{2,16}.

3.2 Collective action for collective impact

The challenges associated with climate impact are complex, but spatially related across disciplinary issues, generations, multiple sectors and community stakeholders²⁰. Policy action in one context will have a relational impact on outcomes in another. This is because of differences in geography, demographics, weather patterns and variations in the agency and motivation of local communities, industries and governments to plan for, or respond to change^{13,27}. In this interconnected context, policy action requires coordination and collaborative governance approaches both to inform the relationships between the multiple levels and types of climate impacts and manage effective planning and action⁵.

Parts of place-based and relational policy system:

- **National structures:** laws, policies and organisations
- **Community structures:** regional or local laws, policies and organisations
- **Community engagements:** interplay between communities and policy across scales
- **Physical structures:** interplay between community, policy and physical environments.

Collective action is fundamentally about facilitating mutual decision-making to address complex problems. Overcoming disincentives to cooperation requires having a collective or common interest between stakeholders and understanding the motivations and agency for change within context¹². Collective action is premised on stakeholders sharing information and knowledge to ensure adaptation action is undertaken that supports both their individual and collective needs.

However, this does not mean that collective action is without its flaws. Changing social, economic and political considerations for each stakeholder can undermine efforts, as can poor communication and lack of leadership. The complex nature of climate change creates changing circumstance throughout the policy process, and this must be addressed by continued, genuine engagement that builds and reinforces trust between stakeholders.

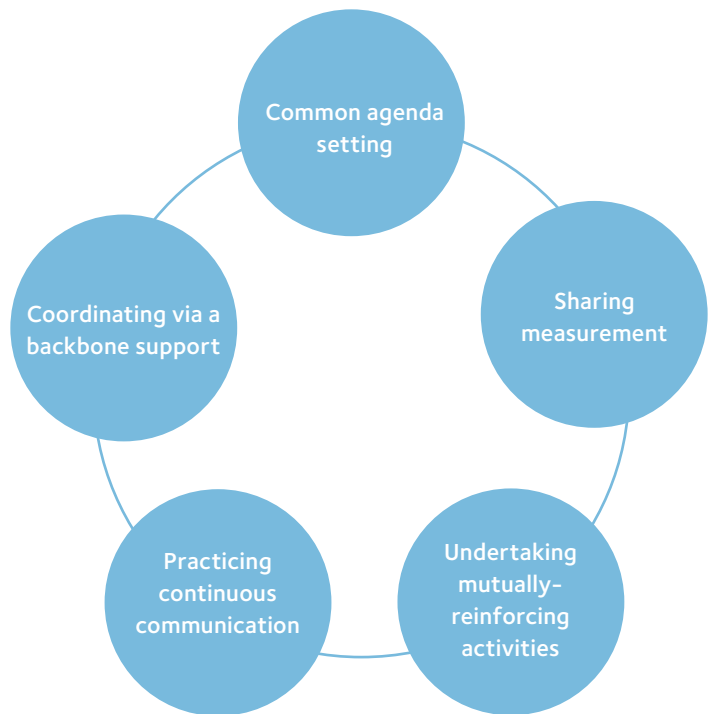
An ongoing process of engagement, information-sharing and collaboration thereby orients coordinated action towards collectively agreed upon objectives.

There are five key functions of a collective impact process^{1,14,23,36}:

- **Common agenda:** Participants have a shared vision for change including a common understanding of the problem and a joint approach to solving it through agreed actions;
- **Shared measurement:** Data are collected and shared by all participants and measured through an agreed, consistent set of performance indicators;
- **Mutually-reinforcing activities:** Participant activities are differentiated to leverage unique skills and resources while still being coordinated through a mutually reinforcing plan of action;
- **Continuous communication:** Consistent and open communication is undertaken between all stakeholders to build trust, ensure progress towards mutual objectives, and create common motivation; and
- **Backbone support:** An organisation with staff and a specific set of administration skills provides the backbone for the entire initiative. The backbone organisation coordinates participating organisations, stakeholders and agencies to ensure the sustainability of engagement and action.

As impacted stakeholders use locally available resources to adapt, this focus on building adaptive capacity is critical to long-term adaptation success^{4,19}. Leadership, collaborative governance, collective action and a collective impact framework are necessary requirements for building and leveraging adaptive capacity at any scale^{25,29}.

Figure 3: Collective impact functions



4. Key determinants of adaptive capacity: Case study

The following international case study explores how the United Kingdom (UK) have explored and addressed their adaptive capacity through ongoing improvements to target regional adaptation success. In this case study we provide a synopsis of their climate change framework and discuss how the key determinants of adaptive capacity have played out in enabling their effectiveness, as well as outlining best practice approaches to building and leveraging adaptive capacity in an institutionally developed country.

4.1 United Kingdom

In UK, the national climate change policy framework sets a pragmatic agenda for place-based adaptation action. These institutional and policy features explain the drivers of adaptive capacity for national and regional climate impact and action²⁴. The overarching policy framework informs a collaborative governance arrangement which informs a collective impact process. Recognising the disparate and uneven impact of climate change on individual communities, each country has sought to implement the elements of collaborative governance to coordinate for collective impact. Each solution is considered locally and developed through coordinated Government processes that seek to share resources and bring stakeholders into the process of building adaptive capacity that will sustain positive climate change adaptation^{8,9,11}.

In this context, adaptation action reflects the climate impact on systems. One of the major risks or stresses associated with climate impact faced by the UK is extreme increase of temperature and rainfall. These climate related risks or stresses faced by UK are multi-spatial in nature and have impacts at multi-sectoral and multi-disciplinary levels.

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Under the Climate Change Act 2008, the UK Government implemented the National Adaptation Programme (NAP) which sets statutory guidelines for targeted adaptation planning and action across the country; understanding that impacted communities and the place of their impact are central in determining the type of climate action that can best address the risks and damages. Under the NAP, policy authorities including the National Infrastructure Resilience Council (NIRC) coordinate with industry stakeholders to gather information on technology and infrastructure challenges that impact long-term adaptation⁹.

The UK's national climate change framework sets a pragmatic agenda for place-based adaptation Collective Action. It emphasises building and sharing adaptation resources of information and skills, respecting the differing political contexts of member countries and supporting regions to address local

problems. The UK approach further highlights the importance of the core functions for achieving Collective Impact, with a strong emphasis on consistent, high-level leadership, mutually agreed goals and comprehensive transparency in reporting progress towards these goals.

Beyond the legal framework, there is a shared commitment to climate action from the individual countries that make up the UK. This system of centralised legislation and planning with devolved implementation provides for a centrally steered, horizontally planned and locally implemented process. Each nation has taken a different approach and identified their unique priorities, where:

- Scotland is making significant investments in flood risk management; the water industry; improving the energy performance of housing; and increasing forest planting and restoring large areas of peatland.
- Wales has strengthened its legislative requirements to build resilience to the impacts of climate change through the Wellbeing of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016.
- The current Northern Ireland Climate Change Adaptation Programme, produced in 2014, focuses on three adaptation principles of Integrating adaptation into relevant key policy areas; developing the evidence base; and communication and cooperation⁹.

A well-defined collaborative governance structure facilitates a place-based adaptation policy system. Continuous Communication is a function of effective network for collaborative governance practice.

In one example of locally implemented climate change adaptation that successfully exploited their determinants of adaptive capacity through effective engagement and collaboration for Institutions, Information and Skills, Social Capital and Economic resources. In this instance, stakeholders in the English county of Hampshire coordinated to address flooding, land degradation and riverine habitat destruction. Stakeholders including residents, local non-profit organisations (such as the River Restoration Centre), river and ecology experts, and the Forestry Commission worked together to restore over 10km of degraded rivers through reconnection and re-forestation of the channels. This work reduced peak flood heights by up to 21% and reduced flow rates of flood water¹⁸. By leveraging local knowledge and engaging all affected stakeholders, the river has been restored to reduce flood risk and enhance the biodiversity of the region, allowing them to effectively address multiple problems through collaborative efforts.

While collaboration for policy planning and climate action is a focus of this framework, organisational functions are also in place to ensure effective practices to avoid red tape and encourage effective adaptation processes within and across sectors, regions and communities, increasing equitable responses and allowing for development of social capital.

5. Ongoing considerations

The climate change adaptation policy environment is a complex space, particularly due to the vast scale of impacts. Yet there are some vital elements that underpin the development of effective climate change adaptation policy, which sets the foundation for and influences the likelihood of successful implementation. The importance of these considerations is clear throughout global climate change research and practice. Drawing on our discussion throughout this brief, we summarise the key policy considerations for leveraging adaptive capacity below:

- 1. Use the function of the determinants of adaptive capacity to better explore opportunities for collective action:** exploring the determinants of adaptive capacity in place may enable better understanding of what is required to overcome barriers for successful adaptation and to further enhance social capital.
- 2. Strengthening meaningful stakeholder relationships** through effective communication and supportive policy requirements. The determinants of adaptive capacity can only be leveraged by facilitating effective governance of adaptation. Institutions are important for guiding the development of options, but implementation will require understanding the place-based community environment and actual living conditions and social systems that must adapt to the impacts and policy changes. The capacity of the social system to interact with and make changes according to adaptation policy is defined as the social capacity or social cohesiveness. This social capital is a key driver of the functions and process of the adaptation governance system that will be needed to support long-term regional adaptation.
- 3. Establish and strengthen a regional collective impact process** to enable collective leadership and collaborative governance that encourages ownership among stakeholders for adaptation action across sectors and regions and appreciated that collective action will be affected by any disconnects between policy settings, business objectives and community understandings
- 4. Establish and strengthen central steering agencies to act as backbone organisations,** facilitating coordination between policy, industry and community stakeholders in the impacted regional context.

6. Conclusions

Adopting collaborative, collective impact approaches has proven to be a nuanced, effective approach to breaking down wicked problems. Climate change adaptation is such a problem, and place-based adaptation is well-suited to coordination through collective impact approaches, which require a continuous process of communication and collaboration between stakeholders. Debate and the sharing of diverse ideas are a critical part of generating a shared problem definition and searching for creative adaptation solutions. With a strong legislative framework in place, the Victorian Government is well placed to leverage policy expertise in place-based approaches and apply this to regional climate change adaptation. The investment by the Victorian State Government in rural adaptation programs provides a strong foundation for such work. Ongoing policy commitment is necessary to make continued progress; informed by the best climate science can offer and shaped by local knowledge.

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