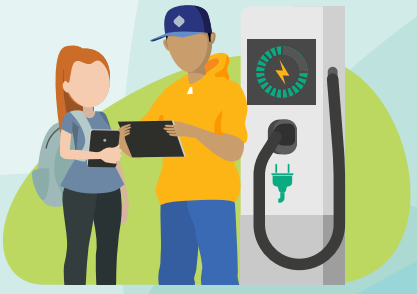
Climate change and sustainability in secondary schools

Findings from a 2020 survey of English-medium secondary and composite schools

Rachel Bolstad



NZCER
Rangahau Mātauranga o Aotearoa

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Summary

This report outlines findings from a survey of teachers and school leaders in a sample of English-medium secondary schools. The survey, carried out between June and August 2020, provides insights into school-wide approaches to sustainability and climate change, teaching and learning opportunities in the classroom, and the impacts of COVID-19 on thinking and practice. The survey is part of a wider NZCER study on climate change and education in Aotearoa New Zealand.

Overall the findings suggest that whole-school approaches and responses to climate change and sustainability—advocated for in the international literature—are not common in New Zealand secondary schools. While students in most schools have learning opportunities relating to climate change and/or sustainability, the nature and focus of these opportunities vary.

Many secondary teachers and school leaders expect climate change will have an impact on their communities within their students' lifetimes. Most survey respondents anticipated physical, biological, social, cultural, and health impacts in relation to climate change. Survey respondents could envisage the possibility of both negative and positive impacts across these dimensions, suggesting some optimism about human agency and control over the extent of climate impacts, and how society will respond to these challenges. Some teachers commented on the challenges of supporting students to have an optimistic and constructive outlook when engaging with the complexities of climate change.

It is uncommon for secondary schools to have a school-wide focus on climate change. Less than half of those surveyed said kaitiakitanga/care for the environment was a school-wide focus. Less than a third identified sustainability as a school-wide curriculum priority, and a fifth identified climate change as a school-wide curriculum priority. Some schools consider sustainability and climate change in operational and procurement decisions, and others do not. Cost, time, and buy-in were among the barriers to identifying and implementing operational and infrastructure improvements that would increase school sustainability and reduce climate emissions.

Secondary schools are generally supportive of student environmental and climate leadership. More than three-quarters of survey respondents said their school has student-led climate, sustainability, or environmental groups, and 70% of respondents indicated support for students who choose to take part in protests or school strike action. Just under two-thirds (63%) said their school community (families and whānau) support a focus on sustainability and climate change. Less than half said their Board of Trustees actively supports such a focus.

The extent of students' learning opportunities in relation to climate change varies between schools. Most schools indicated students have climate change learning opportunities in "some" or "a few" learning areas, and either in "all/most" year levels, or mostly in Years 9–10. Some schools also indicated additional co-curricular opportunities including assemblies, student environment groups and whole-school programmes.

Science and social science subjects are the most likely to address climate change in the classroom. However, we also heard from small numbers of teachers from all learning areas of the *New Zealand Curriculum* who address climate change in their classrooms. Some schools offer specific sustainability classes or integrated/cross-curricular programmes. Although the survey was targeted at teachers who did address climate and sustainability in their classes, a quarter of those responding said climate change was *not* explicitly addressed in the classes they teach.

Causes/impacts and personal actions are a common focus in the classroom. Where climate change is addressed in secondary classrooms, there is generally a focus on teaching about scientific causes and impacts, and opportunities to take personal actions.

Collective and systemic actions are less likely to be a major focus, although this is emphasised and supported in some classrooms. Some teachers commented on constraining factors that limited the extent to which they or their students could engage in collective and systemic change-making as part of their learning.

Student career options and pathways were the least common focus. The least common focus in classrooms where climate change is addressed is "students' career options and pathways in a 'green' or 'transition' economy". Other less common focuses included: mātauranga Māori or other indigenous knowledges as sources for positive climate and sustainability action; the specific impacts of climate change for Pacific peoples; local or regional adaptation or mitigation activities; and critical or media literacy including how to evaluate science evidence or media reporting about climate change.

Teachers want more resources and PLD to support their teaching. While most teachers said they have the knowledge and skills they need to be effective in addressing climate change in their teaching, fewer said they had sufficient access to resources to support their teaching, and only a third said they have good access to PLD in this area. Some teachers said they would benefit from PLD to support their awareness and use of existing resources. Teachers' resource wishlists also included materials relevant to their specific subjects or contexts, localised knowledge and information, and having access to climate science experts and networks of support.

Years 11–13 teachers used NCEA standards across a range of domains. Domains that offer relevant standards included core science, chemistry, physics, biology, Earth and space science, environmental sustainability, agricultural and horticultural science, home economics, economics, and geography. Teachers liked being able to use standards from different subject areas, and being able to apply standards flexibly around open-ended student projects. Some expressed hopes that the NCEA review would further strengthen a focus on climate change and sustainability.

COVID-19 has had different impacts on teachers' and school leaders' thinking and practice with respect to climate change. Some teachers saw the COVID-19 response as an opening for personal and systemic changes that could make a positive impact on climate change and sustainability. Others said COVID-19 had eclipsed all other priorities and thinking, including any attention given to climate change. Some said it had had no impact.

In future phases of our project, we hope to continue to add to our current findings with further insights into what effective climate response can look like across a wide range of learning contexts. We will also look at developments and opportunities in wider policy and system planning in Aotearoa New Zealand, including within the education sector, and cross-sectoral government planning.

1. Introduction

NZCER's research project "Educational policy and practice for a changing climate" explores what kinds of changes or adaptations our education systems may need to make in the immediate and short-to-medium term future, in response to climate change. The project is guided by the high-level research questions in Table 1. We are using a mixture of methodologies to address these questions, including a literature review, key informant interviews, and surveys. The project began in July 2019.

TABLE 1 **Overarching research questions guiding the project**

1. According to national, international, and Indigenous perspectives, how could Aotearoa New Zealand's education systems and policies respond to climate change?
2. To what extent is climate change considered an urgent issue or priority in the education system (for schools, for kura, and in terms of system-level educational policy and planning)?
3. What can be learned from kura Māori and kaupapa Māori approaches and responses?
4. What are the implications or impacts of student-, school-, and community-led climate responses for the educational system in Aotearoa New Zealand?
5. What might education look like in Aotearoa New Zealand, if climate change mitigation and adaptation were factored into policy and practice across the system?

This report outlines findings from a survey of teachers and school leaders in a sample of English-medium secondary and composite[1] schools. The survey was carried out between June and August 2020 and provides insights into whole-school and within-classroom views and practices in relation to climate change and sustainability. The findings from this survey complement previously reported findings from a 2019 survey of English-medium primary and intermediate schools (Bolstad, 2020a), and themes from in-depth interviews with key informants (Bolstad, 2020b).

Survey methodology

An invitation to participate was sent to a representative sample of 149 secondary and composite schools that teach students in Years 9 and above. Schools that declined or did not respond to the invitation were replaced by another similar school. Schools were asked to identify three staff members who could complete the online survey, including:

- one senior leader (such as a principal or assistant/deputy principal) who has a whole-school overview
- two teachers, preferably from different subjects or disciplines, where climate change and/or sustainability is included in classroom teaching and learning, for students in any years between Year 9 and Year 13.

1 We sampled composite schools that teach students in Years 9 and above.

Responses were received from 60 schools in total (40% of the potential 149 schools in the sample). Some schools provided fewer than three responses, and two provided more than the required number of responses. Just over half the schools (52%) returned only one survey response, 45% returned two or three survey responses, and 3% returned four responses. A total of 106 survey responses were received and analysed (24% of a potential 447 respondents, if each school in the sampling frame had returned three staff surveys). Table 2 shows respondents' roles and responsibilities within their schools. Some respondents held multiple roles.

TABLE 2 **Roles of survey respondents (n=106)**

Role(s)	% respondents
Classroom teacher	48
Middle management	42
Assistant principal or deputy principal	22
Principal	9
Other	7

Response rates to this survey were similar to those for the 2019 NZCER National Survey of Primary and Intermediate Schools (Wylie & MacDonald, 2020), and slightly lower than response rates to the 2018 NZCER National Survey of Secondary Schools (Bonne & MacDonald, 2019).[2] The rates of non-response could also be attributed to the additional pressures on schools in 2020 following the COVID-19 response. Higher response rate would give greater confidence that a full spectrum of views and experiences were covered. The data presented here provide a reasonable representation of Aotearoa New Zealand secondary and composite school types. Appendix A provides further detail about the achieved sample, including school characteristics that are underrepresented.

Overview of the chapters

Chapter 2 describes the extent and nature of impacts that survey respondents expect climate change will have on their school's places and communities in the years to come.

Chapter 3 outlines the extent to which sustainability, climate change, and the environment are prioritised in school-wide planning and practice, and in operations and infrastructure.

Chapter 4 describes the nature of climate change learning opportunities across the school curriculum, including co-curricular opportunities.

Chapter 5 discusses what is focused on in different classrooms where climate change is addressed, and what teachers said about resources and PLD support for teaching and learning.

Chapter 6 discusses how the COVID-19 pandemic and response has impacted (or not impacted) thinking and practice about climate change.

Chapter 7 summarises key messages and outlines what is next for this project.

2 The NZCER national survey is a longer paper-based survey.

2. Anticipated impacts of climate change

Climate change is already affecting Aotearoa New Zealand, and we can expect a variety of ongoing and future impacts (Royal Society Te Apārangi, 2016). Region-by-region projections can forecast which parts of the country are likely to experience increases in drought, flooding, coastal erosion / sea level rise, or other environmental effects,[3] and the social, cultural, and economic impacts of these effects can be modelled. However, the specific impacts and risks for people and communities will differ. Variables such as age, education, income levels, housing, and socio-cultural networks are among the factors that affect how different groups can respond to climate stresses (Royal Society Te Apārangi, 2016). Risk and impacts will also vary based on the extent to which local, national, and global adaptation and mitigation plans and strategies are implemented. For example, the Royal Society's 2016 analysis of physical impacts models two future scenarios: a "low-carbon"[4] future and a "high carbon"[5] future, noting that "actual future outcomes may lie anywhere within, but also potentially outside, those contrasting scenarios depending on global developments" (Royal Society Te Apārangi, 2016, p. 13).

Other surveys show that most New Zealanders are concerned about climate change and expect a range of impacts (Leining & White, 2015; IAG, 2020), though some do not think they will personally be affected.[6] A previous survey of primary and intermediate school principals found that more than half expected to see "major" impacts within their students' lifetimes (Bolstad, 2020a). Our survey asked teachers and school leaders in secondary and composite schools about impacts they expected in their school's place and community in the years to come.

Impacts for your school's place and community

Most of the teachers and school leaders we surveyed (90%) expect climate change will have moderate to major impacts on their place and community within their students' lifetimes, and 71% expect this within their own lifetimes. More than twice as many expected "major" impacts in their students' lifetimes (62%) than in their own lifetimes (25%). Just 2% thought that climate change would have no impact in either timeframe.

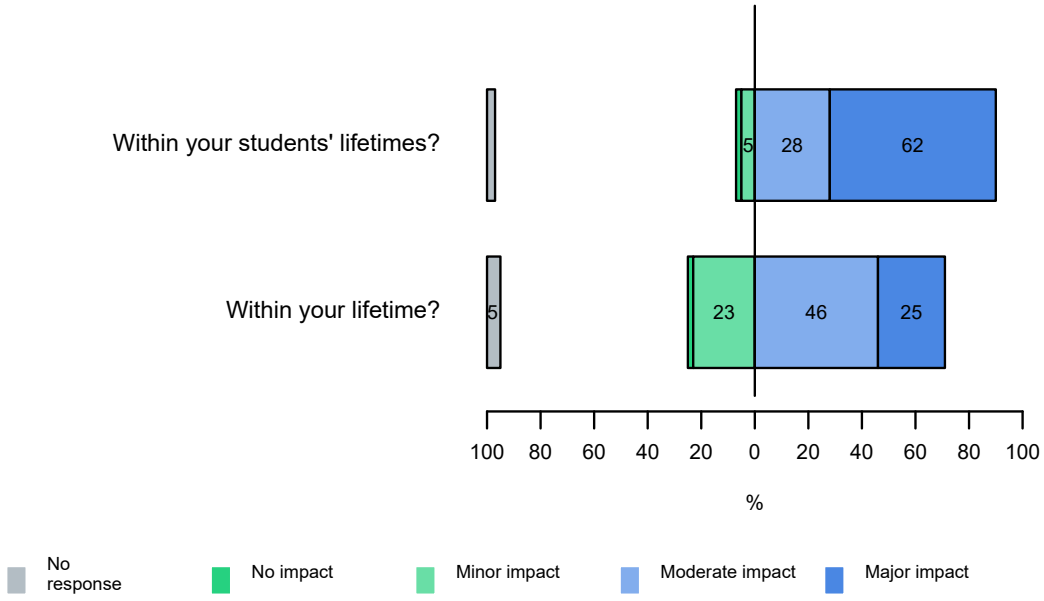
3 See https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/how-could-climate-change-affect-my-region

4 In this scenario, GHG (greenhouse gas) emissions would be capped within a decade and decline to zero net emissions before the end of the century.

5 In this scenario, GHG emissions would continue at close to current levels right through this century.

6 In IAG's (2020) survey of New Zealanders, 62% of New Zealanders said they will be affected by climate change impacts, and 11% said they will not be affected.

FIGURE 1 **Expected impacts on the place and community where your school is located (n=106)**



Potential negative and positive impacts

We asked teachers and school leaders about potential impacts across a range of dimensions (Table 3) and the likelihood that these would be experienced in their place and community during their students' lifetimes. While it is generally understood that climate change will have many negative impacts, asking about positive impacts is also important, in keeping with the view that how climate change will affect us depends in part on how we plan, prepare, and respond, and there are opportunities for people to actively shape the course of our shared futures in positive ways.

Additional comments were supplied by 34 people about impacts on their place and community. Illustrative comments are included throughout this chapter.

TABLE 3 **Types of impacts climate change might have on places and communities**

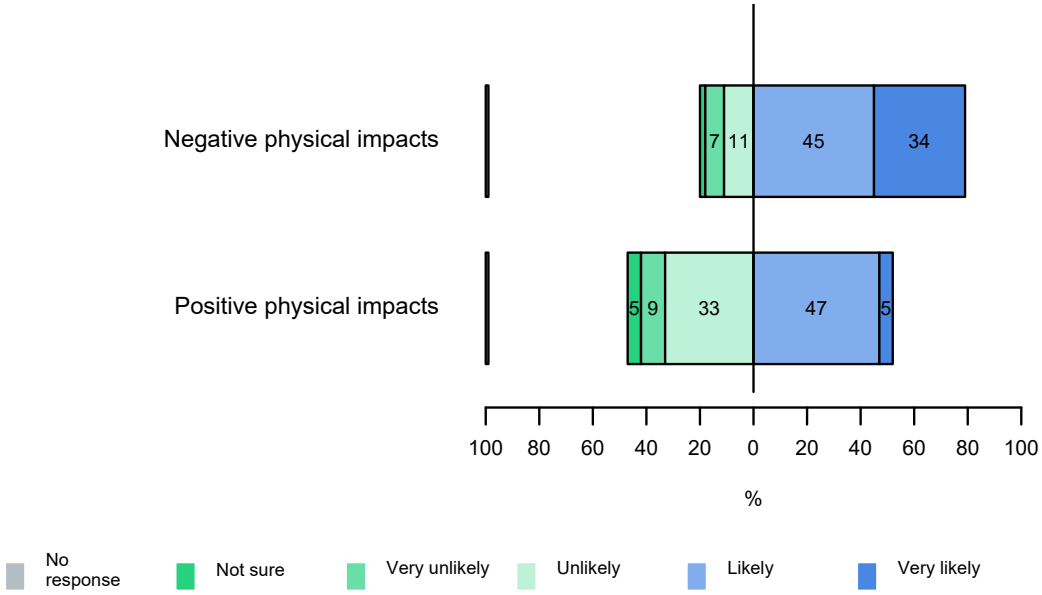
Type of impact		Examples in the survey question
Physical	Negative impacts	Sea-level rise, drought, flooding
	Positive impacts	More resilient or efficient infrastructure
Biodiversity	Negative impacts	Loss of species, reduced biodiversity
	Positive impacts	Regeneration of biodiversity, species making a comeback
Social	Negative impacts	Climate-related migration, economic hardship, conflict
	Positive impacts	Community connectedness, resilience, collaboration
Health	Negative impacts	Poorer mental health, physical health
	Positive impacts	Better mental health, physical health
Cultural	Negative impacts	Loss of cultural knowledge and opportunities, impacts on local food/kai systems)
	Positive impacts	Revitalisation or upholding of indigenous knowledge and people)

Physical impacts

Seventy-nine percent of the teachers and school leaders we surveyed anticipated negative physical impacts in their place and community (Figure 2). Some provided further details as to what this could look like in their area.

> Sea level rise and erosion massive effect for the [name of] coast and student homes
>
> I think our Council will go for a managed retreat (we have a lot of dwellings on our coast).
>
> Climate change impact on horticulture in the area—pests, change of growing climate.
>
> Farming will become more difficult with more severe weather patterns, so we need to make sure that we are equipped to make a just transition into other forms of farming (e.g. hemp, more resilient crops, etc) and have plans to combat unpredictable weather.

FIGURE 2 **Expected physical impacts of climate change (n=106)**



These findings resonate with a recent survey of the New Zealand public, in which more than 80% of responders said they expected to see more frequent and extreme flooding, drought, water shortages, storms, heatwaves, and inundation of coastal locations due to sea-level rise (IAG, 2020). Of those surveyed by IAG, 70% expect that some people may need to move from where they live because of climate change.

Interestingly, 18% of the teachers and school leaders we surveyed thought negative physical impacts were unlikely or very unlikely, at least in the place and community where their school is located. However, 70% of these responders still expected students will experience "moderate to major" impacts in their lifetimes overall.

Just over half (52%) of the teachers and school leaders we surveyed anticipated positive physical impacts in their school's place and communities, suggesting at least some optimism that our built environment will be informed by climate-conscious planning and design. A few examples were described.

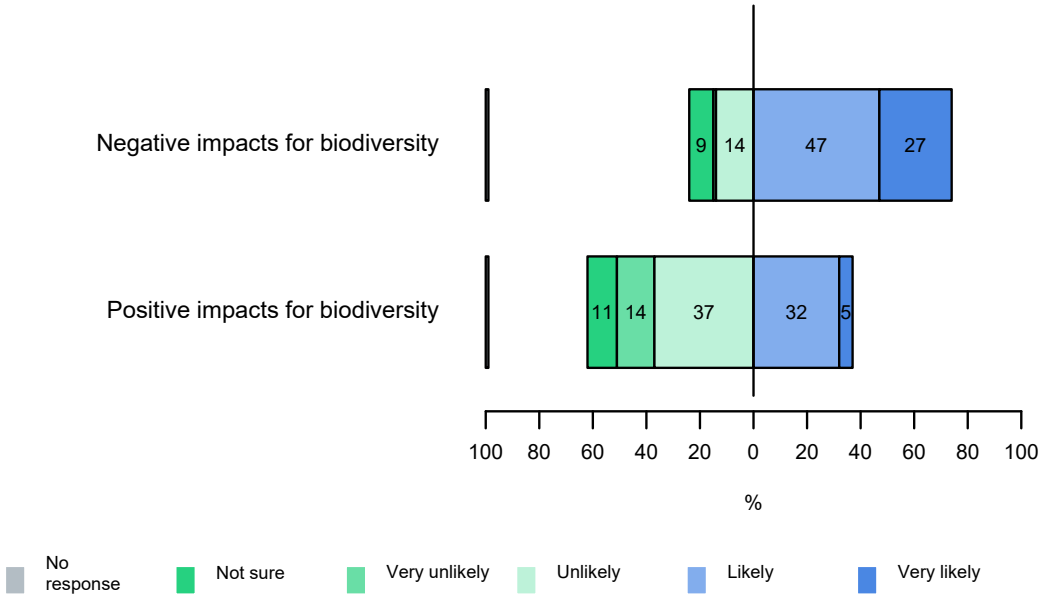
> Our local council has already made significant upgrades to the local infrastructure in response to—and in preparation for—climate-related events and change.
>
> Something positive is the plan by Regional Council to retire farmland and convert it back to wetlands to absorb carbon dioxide.

Similarly, in IAG's recent survey of the public, 75% of New Zealanders said that land use will need to be rethought, and many (77%) thought that government (77%) and local council (72%) should use funds to help build infrastructure that reduces the impacts of climate change.

Biodiversity impacts

Three-quarters (75%) of teachers and school leaders expect negative impacts for biodiversity, while only 37% expected positive biodiversity impacts—the biggest gap between positive and negative impacts across the five dimensions we asked about. Just over half (51%) thought positive biodiversity impacts were unlikely.

FIGURE 3 **Expected biodiversity impacts of climate change (n=106)**



Over half of New Zealand's more than 50,000 species are found nowhere else in the world (Royal Society Te Apārangi, 2016). New Zealand's biodiversity has already declined significantly (Ministry for the Environment & Stats NZ, 2019), and existing environmental stresses will be exacerbated by changing climatic conditions and associated effects. Even with the current rise in average temperatures (about 1°C above pre-industrial levels), it is estimated up to 70 species of native plants are likely to be at risk of extinction this century (Royal Society Te Apārangi, 2016).

Public awareness of threats to New Zealand species through predation, habitat loss, and other factors is generally high, and our previous survey of primary and intermediate schools (see Bolstad, 2020a) indicated a strong focus on students learning about ecological and conservation issues for Aotearoa New Zealand.

Social impacts

While two-thirds (66%) of survey respondents anticipated negative social impacts, almost as many (60%) anticipated positive social impacts (Figure 4). A few described negative impacts they expected in their communities.

> If we have droughts, that affects our dairy farming in a big way and there would be job cuts. This will have a negative impact on the community.

More than a quarter (26%) did not expect negative social impacts, and slightly more (29%) did not expect positive social impacts. Our previous report (Bolstad, 2020b) discusses additional social issues and impacts that climate-informed interviewees anticipate for communities across Aotearoa New Zealand, including disproportionate impacts along socio-economic, geographic, and cultural lines. Some interviewees suggested that more economic privileged families and communities would be more "insulated" from some climate impacts, while families already experiencing stresses and complex social issues linked with income inequalities were likely to be more vulnerable to climate-linked impacts. Social impacts from climate-linked migration were also expected to affect New Zealand, with Pacific peoples already experiencing this impact.

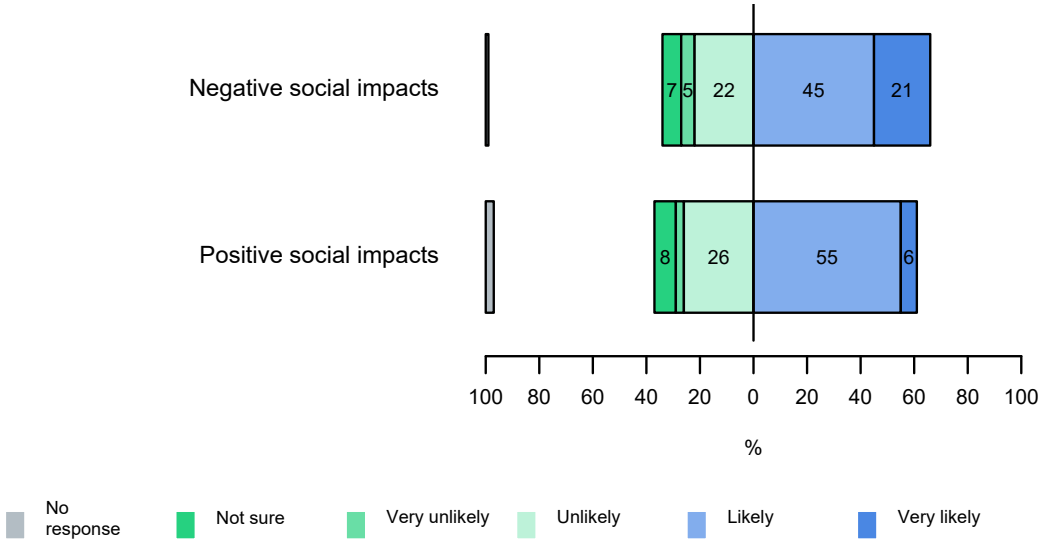
On the positive side, some survey respondents commented on how schools and communities might work together to make positive changes and come together to get through difficulties.

> People will help each other out the best they can.
>
> Watching my community already starting to form strong connections around pest control and protection of the local bush, there's a wonderful opportunity to bridge generational gaps and help make our community more sustainable.

However, some had a bleaker view on the community's capacity to work together.

> Because climate change will happen over a relatively long period of time, I see people gradually adjusting and being focused on themselves unlike COVID/Chch earthquake which was a sudden change that affected everybody and hence everyone pulled together but only for a short period of time. After a while people go back to looking out for themselves.
>
> Currently in the community a number of groups are trying to "future proof" the local environment. They often include younger children from local schools, but there is not necessarily much support from adults in the community. Some adults have been known to damage and destroy work that has been done by these groups and by local schoolchildren.

FIGURE 4 **Expected social impacts of climate change (n=106)**



Health impacts

There was a large gap between expected negative and positive impacts for health impacts (Figure 5). While 59% of those we surveyed expected to see negative health impacts, only 26% expected positive health impacts, and the strength of likelihood was greater for negative than positive impacts. Just under a third (31%) did not expect negative health impacts, whereas 61% did not expect positive health impacts, and 13% were unsure about positive health impacts.

Climate change impacts on human health are complex, and include direct effects from increased exposure to heatwaves, weather events, flooding, and fire; indirect effects from changes to the environment; social effects including disruption to health services; and stresses association with migration and displacement, housing, livelihood, and food security (Royal Society Te Apārangi,

2016). Mental health and community health, as well as physical health, are expected to be adversely impacted, and at least one survey respondent identified youth mental health as a concern in their teaching.

> I'm concerned about the mental wellbeing of students in my classes around this topic but will continue to teach this topic through a lens of hope (even though I might not believe it is very hopeful myself).

FIGURE 5 **Expected health impacts of climate change (n=106)**

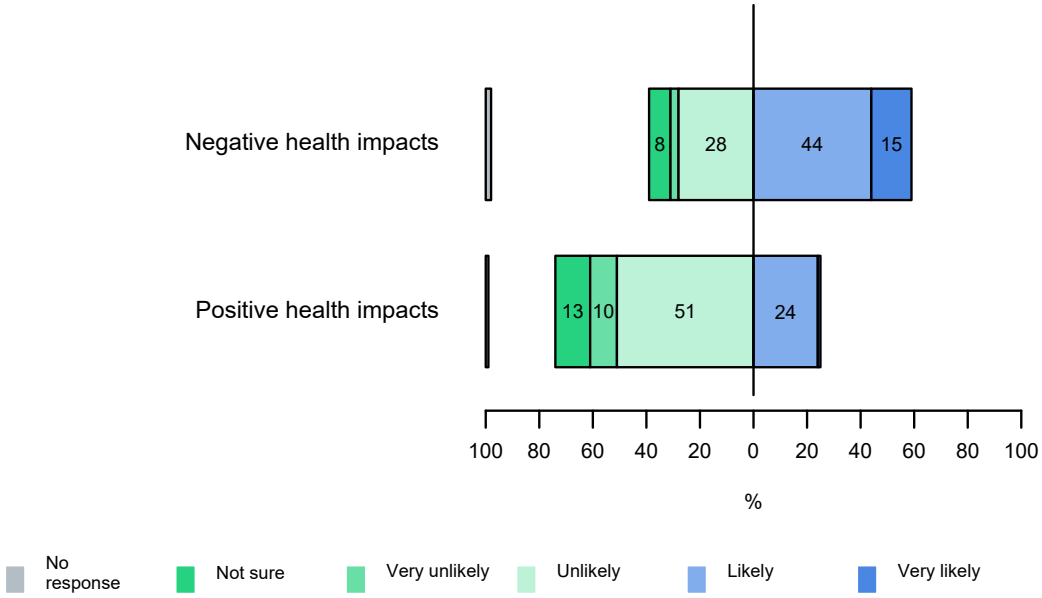
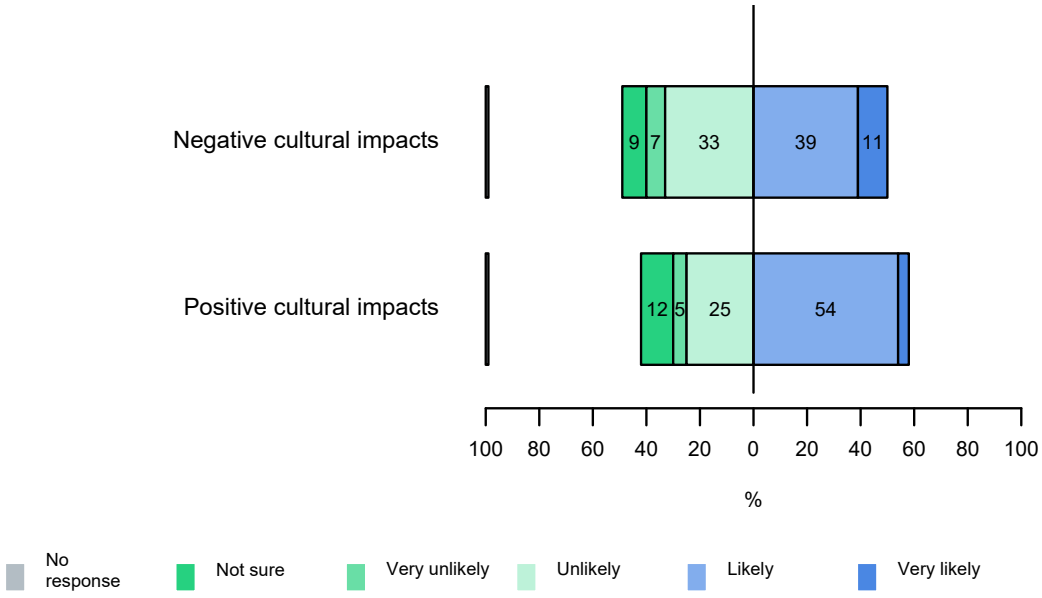


FIGURE 6 **Expected cultural impacts of climate change (n=106)**



Cultural impacts

The only dimension in which expected positive impacts ranked higher than negative impacts was in relation to cultural impacts. While half (50%) expected negative cultural impacts, slightly more (58%) expected positive impacts, though only 4% thought this was *very* likely. Forty percent thought negative cultural impacts were unlikely, and 29% thought positive cultural impacts were unlikely. Survey respondents tended not to provide additional explanations for the cultural impacts they thought would occur. However, our previous interviews with key informants suggest that increased valuing of indigenous knowledge, culture, and sustainability practices was one avenue through which positive cultural—and environmental—impacts could be realised.

Other comments

Other comments in this section of the survey included comments about schools' responsibility to respond to climate change.

> I think it is up to schools to make an effort to educate the next generations about the effects of climate change.
>
> We need to be explicitly teaching our students about climate change and the impacts on our local community if they are to make informed decisions about the future.

Some said this was already happening in their schools, while others felt their schools needed to do more.

> Our school is very proactive with a Sustainability Philosophy adopted five years ago. All staff and students have an individual goal towards reducing our impact on the planet. We are a carbon neutral school with an extensive reuse programme. We use all compostable cutlery and plates/bowls in our dining room/cafe, cook onsite and are a water only school. Students have helped planning to install a biodigestor onsite to use green waste to produce biogas. We separate all waste at source and students are mentoring other schools to do the same in our wider community.
>
> Over time our school may develop a stronger focus on climate change. We still have a coal boiler, and a major solar PV [photovoltaic] system that I worked towards has been year after year postponed.

While some suggested climate change response would bring people together, some expressed concern that the challenges of climate change were not being taken seriously, or that self-interest would clash with what may be in the collective interest.

> The community often talks about climate change but very few people appear prepared to sacrifice comfort and lifestyle to slow the change. More people drive to more places and [there is] less provision for cyclists.
>
> I'm surprised at the lack of empathy towards climate change—e.g. people thinking it is someone else's problem.
>
> I don't see that many positives coming from the impacts of climate change, to be honest! (Unless we get radically and practically serious about decarbonising our society/economy within the next 5–10 years).

Only one survey respondent wrote a comment debating the legitimacy of concerns about climate change, calling it a "dishonest science".

Summary

Most survey respondents anticipated physical, biological, social, cultural, and health impacts in relation to climate change. Survey respondents could envisage the possibility of both negative and positive impacts across these dimensions, suggesting some optimism about human agency and control over the extent of climate impacts, and how society will respond to these challenges. Some teachers commented on the challenges of supporting students to have an optimistic and constructive outlook when engaging with the complexities of climate change.

3. School-wide priorities and practices

International literature identifies the importance of "whole-school" approaches to climate change response (Gibb, 2016). Whole-school approaches recognise that schools have a multifaceted relationship to the environment and to the climate, and that everyone can play a role in reducing climate impacts and planning for climate resilience and adaptation. A whole-school approach recognises that schools have direct environmental and climate impacts through their infrastructure, resource use, waste management, transport, and other operations. Schools can also demonstrate commitments to sustainability, climate, and the environment through curriculum design, co-curricular activities, and school-wide values, culture, and norms.

International models for "climate-ready" schooling (Chopin et al., 2018) identify the need for high-level strategic planning that weaves climate and sustainability thinking into all school practices, and decision-making at every level. This includes engagement from school leadership and governance, as well as staff, students, and the wider school community. However, it is important to note that a "whole-school" approach to climate and sustainability does not mean that individual schools can—nor should be expected to—develop coherent climate and sustainability responses on their own. System-wide factors—including educational policy, strategic investment, and prioritisation—are also important in shaping what schools can do, or choose to do. Our previous survey of primary and intermediate principals (Bolstad, 2020a), and key informant interviews (Bolstad, 2020b) highlighted the need for high-level visibility of messages about climate change "from the top". As one interviewee noted,

> We tend to do a really good job in education of saying, 'We want to do this', and then it is just left to people to get there on their own. Not all schools are created equal. And in this instance, that's not going to be acceptable (Secondary educator, cited in Bolstad, 2020b)

New Zealand's decentralised network of self-managing schools allows for a significant level of autonomy, diversity, and creativity in the design and delivery of localised curriculum. School principals and their Boards of Trustees also carry considerable responsibilities in relation to school property and finance. We were therefore interested in the extent to which sustainability and climate are prioritised in school-wide planning, what value schools placed on sustainability, environment, and climate, and how this might be reflected in school infrastructure and operations.

School-wide support and prioritisation

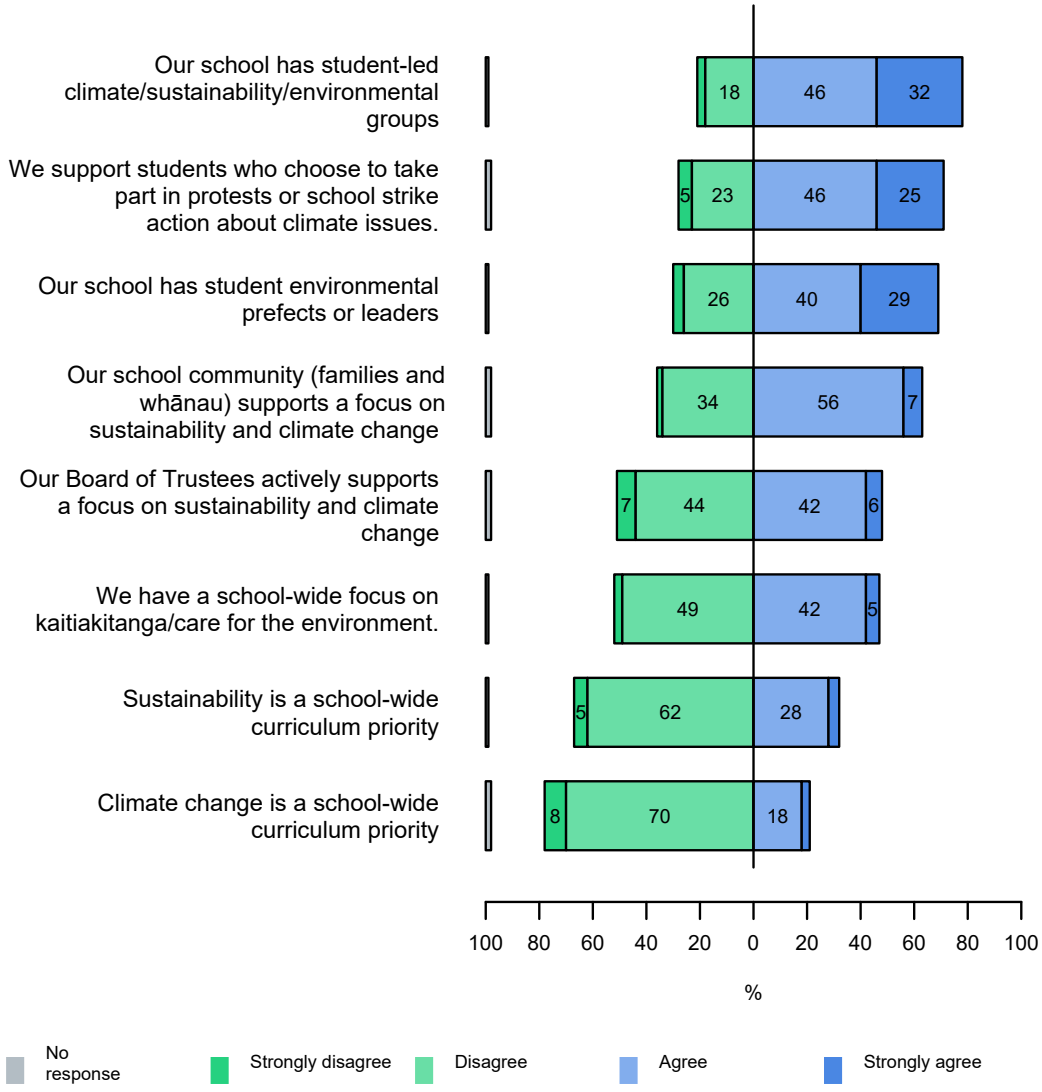
We asked teachers and leaders about school-wide climate and sustainability practices or priorities that might be in place within their schools (Figure 7). Responses suggest that while support for student leadership and engagement in climate and sustainability is relatively high, school-wide prioritisation of sustainability and climate is relatively low. Most said that their school has student-led climate, sustainability, or environmental groups (78%). Most (70%) indicated support for students

who choose to take part in protests or school strike action about climate actions. Slightly fewer schools had student environmental leaders or prefects (69%).

More than half (62%) said their school community (families and whānau) supports a focus on sustainability and climate change, although only 7% strongly agreed that this is the case. Less than half (47%) said their Board of Trustees actively supports a focus on sustainability and climate change, and just 6% strongly agreed that this is the case. In terms of school-wide prioritisation, less than half (47%) indicated a school-wide focus on kaitiakitanga/care for the environment. About a third (32%) said sustainability was a school-wide curriculum priority, and just 21% said climate change was a school-wide curriculum priority. Very few strongly agreed that any of these were a priority.

A handful of schools did strongly identify climate and sustainability as school-wide priorities, and a small number of respondents indicated they had a special school-wide role or responsibility, such as Enviroschool Leader or Director of Sustainability.

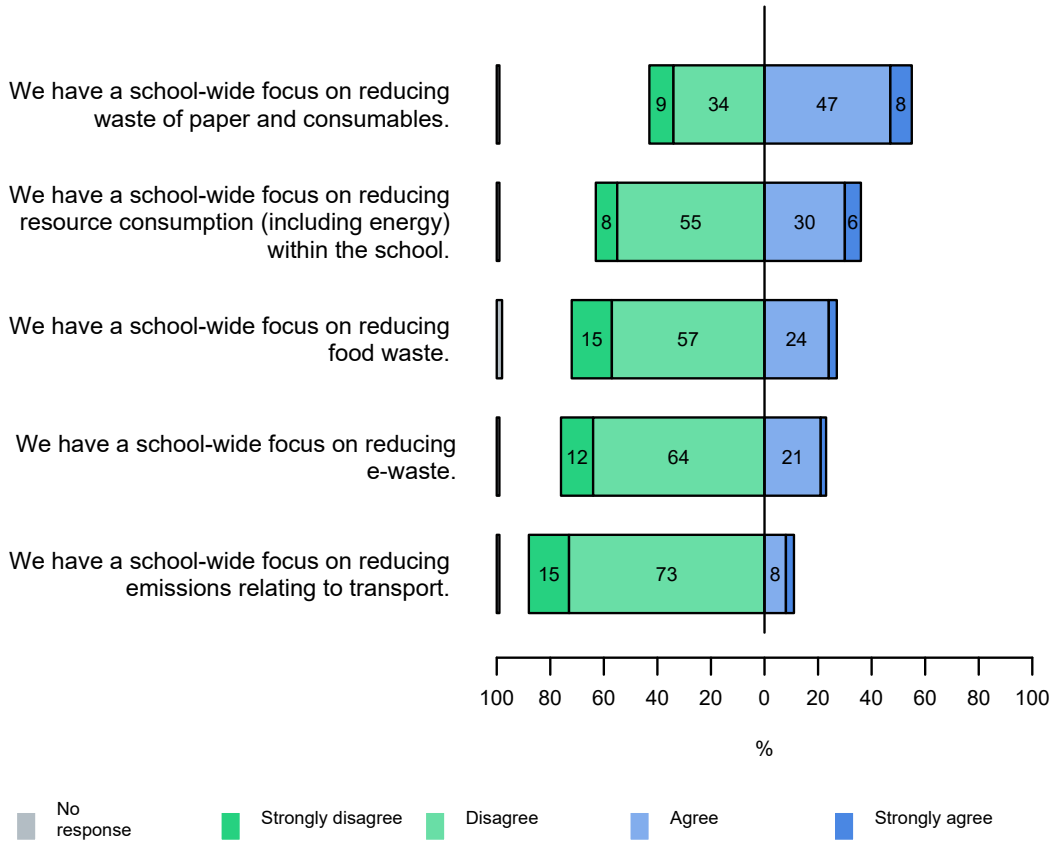
FIGURE 7 **School-wide support and prioritisation (n=106)**



Resource consumption and waste management

Over half (56%) said their school has a focus on reducing waste of paper and consumables, and just over a third (36%) had a focus on reducing resource consumption, including energy. Around a quarter indicated a focus on reducing food waste (26%) or e-waste (23%).

FIGURE 8 **Resource consumption, waste management, transport (n=106)**



Transport

Just 11% of respondents said their school has a focus on reducing emissions relating to transport, similar to findings from a 2019 survey of primary and intermediate school principals (Bolstad, 2020a). Road transport accounts for approximately 18% of New Zealand's GHG (greenhouse gas) emissions and, with the growth in road transport, is one of the five main contributors to the increase in New Zealand's overall emissions since 1990 (Ministry for the Environment & Stats NZ, 2019).

School-related transport emissions are not necessarily something schools can easily address on their own. While schools use transport for some "school-time" activities (field trips, camps), most school-related transport stems from students and staff travelling to and from school each day. At a national scale, school transport patterns have changed significantly over the last few decades. The New Zealand Health Survey identified a "dramatic drop" in active transport (walking, cycling, scooters)

to school from the late 1980s to the mid-2010s,[7] and the 2018 census found that half of New Zealand students now travel to school in a private vehicle (Theunissen, 2019). While schools can encourage low-carbon options such as walking, cycling, and public transport, these options are not always available for all families and whānau, and are interlinked with many other factors including housing, employment, public transport infrastructure, and school choice.

Developing system-wide approaches to reduce schooling-related travel emissions requires future-focused urban planning, transport design, and consideration of the cumulative impacts of individual people's travel needs and options. For example, Devonport (2017) modelled the potential for a sizeable reduction in carbon emissions in Christchurch if secondary students attended their closest schools, rather than driving or being driven to schools further away.

In-depth interviews carried out in a previous stage of this project illustrate the need for creative and climate-informed long-term thinking around these kinds of issues (see Bolstad 2020b). Interviewees speculated on the possibilities for large urban schools to have satellite campuses or walkable local places for learning where students might spend some days of their learning week, rather than travelling a large distance every day. Ideas for supporting young people's active transport (walking, cycling) included visions for ensuring shaded, tree-lined walking routes and water stations to keep young people safe and healthy.

Infrastructure

Eighteen respondents had oversight of their school's policies and practices relating to property, procurement, and energy use.[8] Eight said their school currently specifies sustainability and climate requirements when making procurement decisions for goods, services, refurbishments, and/or new builds. Seven said this does not currently happen in their school, and three were not sure.

We asked whether schools had carried out any climate and sustainability reviews or audits of their operations in the past 2 years (Table 4). Half had, and half had not. Reviews of energy consumption were the most common kind of review/audit. Two people said their school had accessed external support, funding, or professional expertise to carry out reviews/audits, two were not sure whether external support had been used or not, and nine said no external support had been accessed. Table 5 shows specific opportunities that were identified through these audits.

TABLE 4 **Reviews or audits carried out within the past 2 years (n=18)**

Type of review/audit	n
Review or audit of school's energy consumption	9
Review or audit of whole-school sustainability practices	4
Review, audit, or calculations of the school's carbon footprint	1
None of the above	9

7 See https://www.ehinz.ac.nz/indicators/transport/active-transport-to-and-from-school/#dramatic-drop-in-active-transport-use-to-school-from-198990-to-201014

8 The low number of responses to this section is likely because more schools returned responses from assistant or deputy principals than principals.

TABLE 5 **Specific opportunities identified through reviews/audits (n=18)**

Opportunities identified	n
Opportunities to be more energy efficient	10
Opportunities to reduce our carbon footprint	4
Opportunities to offset our carbon emissions (e.g. tree planting, purchasing carbon offsets)	2
None of the above	3

Twelve people commented on barriers to implementing improvements or taking up improvement opportunities that had been identified through reviews and audits. The most common issue was cost, particularly the up-front costs to replace existing infrastructure with more energy-efficient systems.

> Options to improve energy efficiency require an up-front cost that is difficult to justify.
>
> To remove our coal fired boiler will require capital funding; we are using a lot of our 5YA[9] funding to help upgrade to more efficient energy systems.

Other issues included time (for staff to follow through on initiatives identified through audit processes), competing priorities, and "buy-in" from students, staff, and the community.

> Community understanding of the issues.
>
> All staff and students cohesively buying into energy efficiency and environmental sustainability.
>
> Time and other very urgent priorities.

Summary

Our survey data suggests that while support for student involvement and leadership in environmental, sustainability, and climate issues is relatively high in secondary schools, school-wide prioritisation of these issues is relatively low. In contrast, our 2019 survey of primary/intermediate schools identified kaitiakitanga/care for the environment as a common school-wide focus. Secondary schools also tended to have lesser focus than primary/intermediate schools on reducing various forms of waste and resource consumption. Only 18 schools we surveyed in 2020 were able to provide more detailed information about property, procurement, and energy use. Of these, just under half said their school currently specifies sustainability and climate requirements when making procurement decisions. Some schools have audited their energy use or other operational systems, but where opportunities have been identified to lessen the climate or environmental impacts, these have not always been operationalised, in part due to costs.

9 5 Year Agreement, a capital funding budget given to each board of trustees to use over a 5-year period to upgrade, modernise, or replace existing buildings.

4. Climate change learning opportunities across the school curriculum

Climate change and sustainability are complex, multifaceted issues with relevant connections to many knowledge domains and disciplines. In theory, learning opportunities could emerge or be planned for within any subject or learning area. These topics can also provide a context integrating learning across multiple knowledge domains. Co-curricular and community-based activities may provide additional opportunities for students and teachers to engage with climate change and sustainability in local and regional contexts.

We asked respondents about students' learning opportunities relating to climate change across their school curriculum, at different year levels, and in other areas of school life. We also asked teachers if climate change was addressed in any of the classes they teach, and in which year levels and subject areas.

Learning areas and year levels

In most schools, students were said to have climate change learning opportunities in "some" or "a few" learning areas across the school's curriculum (Table 6). These opportunities tended to occur for students at all or almost all year levels (43%), or particularly at Years 9–10 (Table 7).

TABLE 6 **Climate change learning opportunities across the school curriculum (n=106)**

Learning areas	%
In most learning areas	9
In some learning areas	52
In a few learning areas	36
In no learning areas	1
Not sure	2

TABLE 7 **Year levels where students have learning opportunities related to climate change (n=106)**

Year levels	%
In all/almost all year levels	43
Mostly in Years 9–10	38
Mostly in Years 11–13	8
Not in any year levels	1
Not sure	11

Additional and co-curricular opportunities

Other opportunities for students to engage with climate change and sustainability in school included through school assemblies, whole-school programmes, and integrated programmes (Table 8).

TABLE 8 **Additional climate change learning opportunities for students (n=106)**

Additional learning opportunities	%
School assemblies	55
Whole-school programmes (e.g. environment week)	40
Integrated curriculum/Interdisciplinary programmes	40
Other	22

Of the "other" opportunities described, 12 respondents mentioned student groups, clubs, or committees (e.g. environment or kaitiakitanga committees, student council), some involving external programmes such as Enviroschools and Roots and Shoots.[10] Six mentioned other kinds of opportunities such as Future Problem-Solving,[11] or projects with the community.

> Junior Course Week at the end of the year (usually 5 days) students can opt into it if they are interested in being part of this course.
>
> Our Global Living Programme (2 hours per week for all students) with all teaching and learning based on WHO Sustainable Development Goals. All students are required to complete service and most service relates to sustainability and environmental initiatives in our local community. We are growing 5000 native trees and shrubs onsite, so many [students] are involved in this project and planting these in [name of city].

Subjects in which climate change is addressed

The survey asked respondents whether *they* had taught students in Years 9 or above within the past 2 years, and, if they had, whether climate change was explicitly addressed in any of their classes. Most survey respondents (88%) *had* taught students in Years 9 or above within the past 2 years; however, only 63% said they explicitly addressed climate change in any of the classes they taught.

10 http://www.janegoodall.org.nz/roots-shoots/
11 https://www.fpsnz.co.nz/

TABLE 9 **Whether climate change is addressed in teachers' classes (n=106)**

Respondent's school role	%
Teaching role—climate change addressed	63
Teaching role—climate change not addressed	25
Non-teaching role	12

Because this was a filtering question, subsequent questions about classroom teaching and learning with respect to climate change were only completed by 63% of respondents (n=67).

Subjects and year levels

Teachers were asked the subject area(s) and year level(s) of classes they taught in which climate change was addressed. The most common learning areas were science and social sciences (Table 10), though all other learning areas were evident across the sample, albeit in small numbers. Integrated/cross-disciplinary or "passion project" classes were also evident particularly in Years 9–10, and sustainability classes particularly in Years 11–13.

TABLE 10 **Subject areas and year levels in which climate change is a focus (n=67)**

	% Years 9–10	% Years 11–13
Science subjects	36	22
Social science subjects	28	15
Integrated/cross-disciplinary or "passion project" programme	15	5
English	6	8
Sustainability	5	12
The Arts	5	5
Mathematics subjects	3	3
Languages	3	3
Technology subjects	3	3
Te reo Māori	2	2

Specific classes or courses included general subject classes such as science, social studies, English, and art, as well as specific sub-disciplinary classes including agriculture, food and nutrition, chemistry, home economics, religious studies, economics, business studies, geography, tourism, and Earth and space science. Various kinds of integrated courses were also described, such as Earth and space science with statistics, STEM, integrated studies, Integrated English/social sciences, "Global living", "Sustainable water and climate", "Junior course week", and "Regeneration projects on camp".

In other parts of the survey, some teachers said that climate change needed to be made more of a priority in school learning and teaching, and some argued for a focus on other important intersectional issues.

> I think climate change needs to become a priority in the school curriculum, along with a host of other interconnected issues (pollution, deforestation, ocean acidification, biodiversity loss, social/racial issues etc).
>
> Climate change is important—but before we can focus on this we need to make sure basic needs, e.g. access to health, food, etc is good.
>
> There also needs to be focus on the decline in biodiversity. To be successful in surviving climate change our biodiversity, ecosystems need to be robust.

Summary

Opportunities for engaging with climate change across the curriculum varied across the schools we surveyed. In most schools, students appear to have climate change learning opportunities in "some" or "a few" learning areas, and either across year levels, or mainly in Years 9–10. Students in some schools have additional co-curricular opportunities to engage with climate and sustainability, though the extent to which these are focused on climate change versus other sustainability focuses is not known. In terms of subject/disciplinary areas, the survey had a strong representation from teachers of science and social science subjects, and responses from every learning area were received across the survey sample, albeit in small numbers. Some schools have integrated or cross-curricular programmes.

5. Climate change in the classroom

Climate change presents a huge range of potential learning contexts and focuses. However, other literature, and interviews with key informants (Bolstad, 2020b), suggest that while some students may learn about the scientific causes and impacts of climate change, this is not guaranteed to happen across all schools. Some students we have interviewed for this project talked about having had minimal learning opportunities in relation to climate change, or only encountering it in terms of debates about whether it is happening. Other students we have interviewed said it was common for teachers in their schools to weave climate and sustainability themes into their programmes.

With the expectation that climate change learning opportunities may vary considerably between schools, we were interested in exploring what is in focus in classrooms where climate change is addressed, and the extent to which students have opportunities to engage with intersections between climate change and various scientific, social, cultural, economic, psychological, and political knowledge domains. We were also interested in the extent to which climate change learning focused on local and personal/community contexts, personal or collective action, and whether students were learning about pathway opportunities into further learning or future careers.

What is focused on in the classroom?

We asked teachers about 19 things that might be a focus for learning and teaching in relation to climate change, clustered around concepts such as science and technology/causes and impacts, social, cultural, local, and system impacts, and actions, personal meaning, and pathways. Teachers were asked whether each thing was a major, moderate, or minor focus, or not a focus. These possibilities reflect ideas from the literature on climate change education as well as themes from in-depth key informant interviews (see Bolstad 2020b).

Most common focuses

Table 11 shows the items organised from most to least common “moderate” or “major” focus. Graphs showing the full details for each cluster of concepts are included in Appendix B. The two most common things overall were personal actions that individuals can take to have a positive impact, and scientific knowledge about the causes and impacts of climate change. It was also common to have discussions about impacts for human health and wellbeing, and whether climate change is caused by humans, and/or whether it is a global crisis.

TABLE 11 **Secondary classroom teaching and learning focus (n=67)**

	% Moderate or major focus
Personal actions – things we can do as individuals to have a positive impact	84
Scientific knowledge about the causes and impacts of climate change	81
Impacts of climate change on human health and wellbeing	76
Discussion about whether climate change is caused by humans, and/or whether it is a global crisis	75
Specific impacts of climate change for Aotearoa New Zealand	73
Impacts of climate change for non-human species	73
How students are feeling about climate change	70
Scientific and technological innovations that reduce the impacts of climate change	69
Specific impacts of climate change for our region/local area	66
Things we can do collectively as a school and community to have a positive impact	64
Systemic actions – things that governments can do to address climate change	64
Interconnections between different systems in relation to climate change	61
Social inequalities and social justice – how different people/groups will be impacted by climate change	60
Specific impacts of climate change for Pacific peoples	55
Adaptation or mitigation activities that are underway in our region/local area	53
Economic impacts of climate change	52
Critical literacy or media literacy – how to evaluate science evidence or media reporting	51
Mātauranga Māori, and/or other indigenous knowledge and practices, as sources for positive climate and sustainability action	46
Students' career options and vocational pathways in a 'green' or 'transition to low emissions' economy	25

Least common focuses

Of the 19 things we asked about, most teachers were likely to say they were at least a "minor" focus. However, a few items were described by more than 20% of teachers as "not a focus". The least common, by a significant margin, was "students' career options and pathways in a 'green' or 'transition to low emissions' economy". This was typically either not a focus (31%) or only a minor focus (42%). Mātauranga Māori or other indigenous knowledges as sources for positive climate and sustainability action was "not a focus" for 21% of teachers, and 21% said specific impacts of climate change for Pacific peoples was "not a focus". A third of teachers indicated a "minor" focus on critical or media literacy, such as how to evaluate science evidence or media reporting about climate change, and 13% said it was "not a focus".

Personal, collective, and systemic actions

In terms of action-taking that learners might engage with to make an impact in relation to climate and sustainability, personal/individual actions were more than twice as likely to be a "major focus" than collective school and community actions, local/regional activities, and systemic/government actions.

TABLE 12 **Personal, collective, and systemic actions in the classroom (n=63)**

	% Major focus
Personal actions—things we can do as individuals to have a positive impact	57
Things we can do collectively as a school and community to have a positive impact	25
Adaptation or mitigation activities that are underway in our region/local area	22
Systemic actions—things governments can do to address climate change	21

The significant focus on personal action over other forms of collective and systemic action could be interpreted as both a strength and a deficiency. Interpreted as a strength, this could indicate that teaching approaches are geared towards supporting students to understand climate change not as just an abstract and distant idea, but a matter that has personal relevance and connection, and over which they have some degree of agency and control. Focusing on personal action can also highlight the ways in which individual consumer choices and citizen actions can collectively add up to have significant climate and environmental impacts. Key informants we have previously interviewed stressed the psychological importance of people knowing that certain impacts and outcomes of climate change are not inevitable, and depend on human choices and actions. However, there are also valid reasons to critique the dominance of "personal action" discourses in relation to climate and the environment. For example, a focus on personal action can obscure wider collective and systemic causes over which individuals may have more limited control. The "personal action" focus may also obscure other kinds of inequities. For example, people's consumer choices may be constrained by social, economic, geographic, or cultural factors beyond their control.

At a school level, teachers and students may find it easier to focus on personal choices or actions they can take within their classroom or personal lives, rather than taking on a burden of responsibility for initiating or driving more collective school-wide actions, or wider regional, community, or national-level actions. Such actions often involve longer timeframes, sustained advocacy, and a broader base of support from people in positions of power in order to have a tangible impact. Nevertheless, our research and other literature has identified a range of examples where students and young people have been involved in collective actions or advocacy for actions at school, regional, and national levels.[12] Examples shared elsewhere (Bolstad, 2020b) include secondary-aged students contributing to district planning around climate mitigation and adaptation, and primary schools engaging with the implications of climate change for their place and community. Several teachers in the survey provided additional examples of collective action-taking in their classes, such as:

> Empowering students to lead projects and take action individually or in small groups. Supporting students to present to the board, communicate with our community, run projects from feasibility to completion, and be actively involved in driving all school sustainability initiatives.

12 Prominent examples include Generation Zero, a youth-led climate action organisation that played a significant role in advocacy and campaigning for the Zero Carbon Act, and the organisation of the School Strikes for Climate marches.

A recurring theme in contexts where collective actions occur is that learners are supported by adults who value young people's contributions, and who can sustain enabling support and connections over time, both within and beyond the school. However, some teachers in the survey identified constraints on what they, or their students, could take on, including from a time and wellbeing perspective.

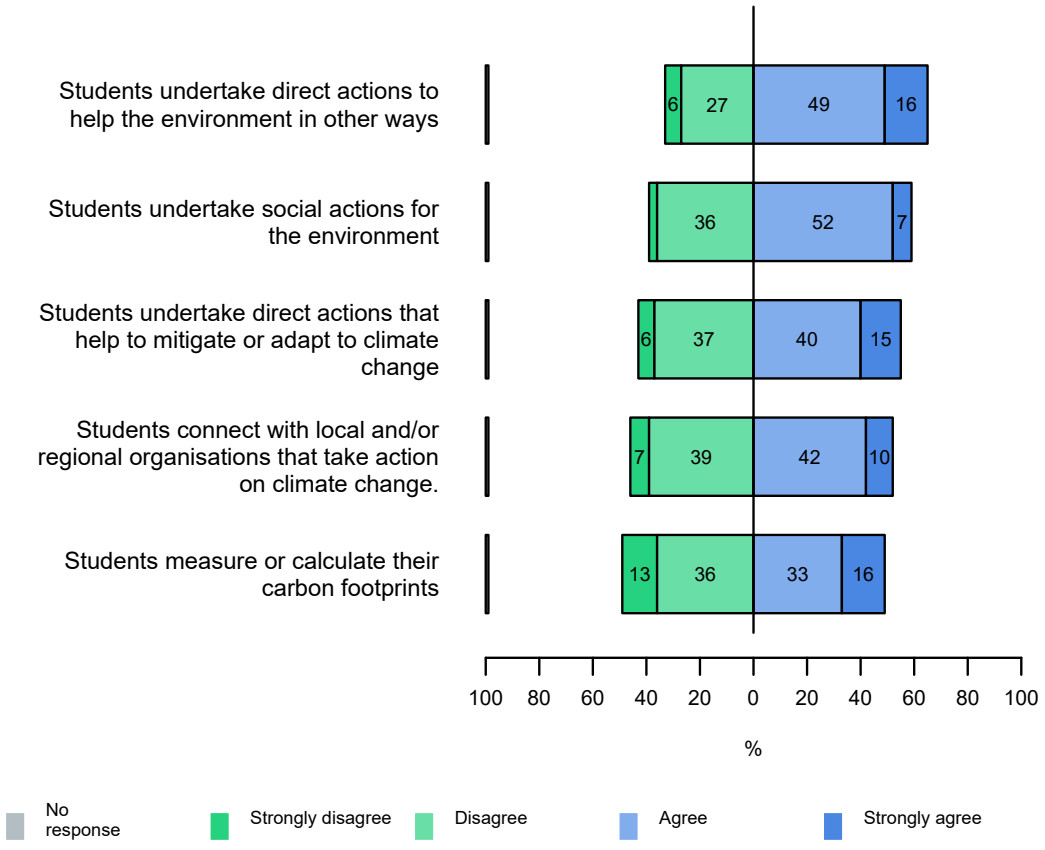
> We have limited time to cover so many vital issues. We have been focusing on positive themes due to developing anxiety and wellbeing around our students. The problem we have been facing is that so much needs to be done across so many areas and we only have limited time.

> I'm an English teacher working with the Education for Sustainability standards as a way to provide real life learning, literacy and evaluation skills for my students. I've struggled with how to pitch my course to students, and how to develop agency with my learners. I've loved the opportunities this course has offered to get out into our environment with my students and broaden their horizons. But I work alone in my school.

Other actions students take as part of their learning

We asked teachers about a few more specific activities students might engage in as part of their climate learning, using an agree/disagree scale to identify if these activities happened in the classroom or not (Figure 9). The most common activities involved students taking actions to help the environment (65%) followed by taking social actions for the environment (59%). Just over half (55%) said students undertook direct actions that help to mitigate or adapt to climate change, or connected with local and/or regional organisations that take action on climate change (52%). Just under half (49%) said students measure or calculate their carbon footprints, and 13% strongly disagreed that this happened.

FIGURE 9 **Other actions students may take as part of their learning (n=67)**



Subject area differences

In terms of subject areas, only sciences and social sciences subjects had enough responses to test for statistically significant differences. Only a few significant differences were detected. Teachers who taught social science subjects were more likely than other teachers to include a moderate or major focus on economic impacts of climate change (80%), and to focus on interconnections between different systems in relation to climate change (81%). Not surprisingly, all teachers who taught science subjects indicated a focus on scientific knowledge about the causes and impacts of climate change. Science teachers were less likely than other teachers to focus on social inequalities and social justice, although a subset of science teachers indicated this was a "major focus". Science teachers were also more spread in the extent to which human health and wellbeing impacts were a focus. This may reflect the different subdomains of science these teachers taught.

Other focuses in the classroom

Seventeen respondents made additional comments about what was focused on in their classrooms. The most common comments related to action-taking, including how students could initiate or lead action in their school and community.

> What social action is and how to get involved in making a change. How successful different types of social action is. Famous young activists that have made a real change.

A few commented on specific knowledge content they covered in relation to climate change, such as ocean acidification, food waste management, nutrient cycles and the carbon sequestering abilities of plant and soil life, and climate impacts on the food chain. A few noted that they focused on "things that are topical", things students may have seen on television, and discussion topics initiated by students themselves.

> Our discussions are often student led, so each class is different. We discuss too, why some people care and others don't and the fact that some of this is due to no education rather than disrespect.

One teacher mentioned a focus on a Christian view of creation, including people's roles as stewards/kaitiaki for the environment.

Student and teacher wellbeing

Some noted the challenge of giving due attention to complex and potentially heavy issues like climate change within existing school systems and structures, while keeping a positive and constructive focus and supporting mental wellbeing.

> It's hard to balance being positive about the possibility (need) for change that can make a difference so as not too utterly depress young people, but also to impress upon them the gravity of the situation.

> We have been very aware of the mental wellbeing of our students as we discuss climate change. Some of the information is overwhelming and can make them feel despondent about what they can do. We tried to keep it simple and look at the actions that individuals could do to make a change.

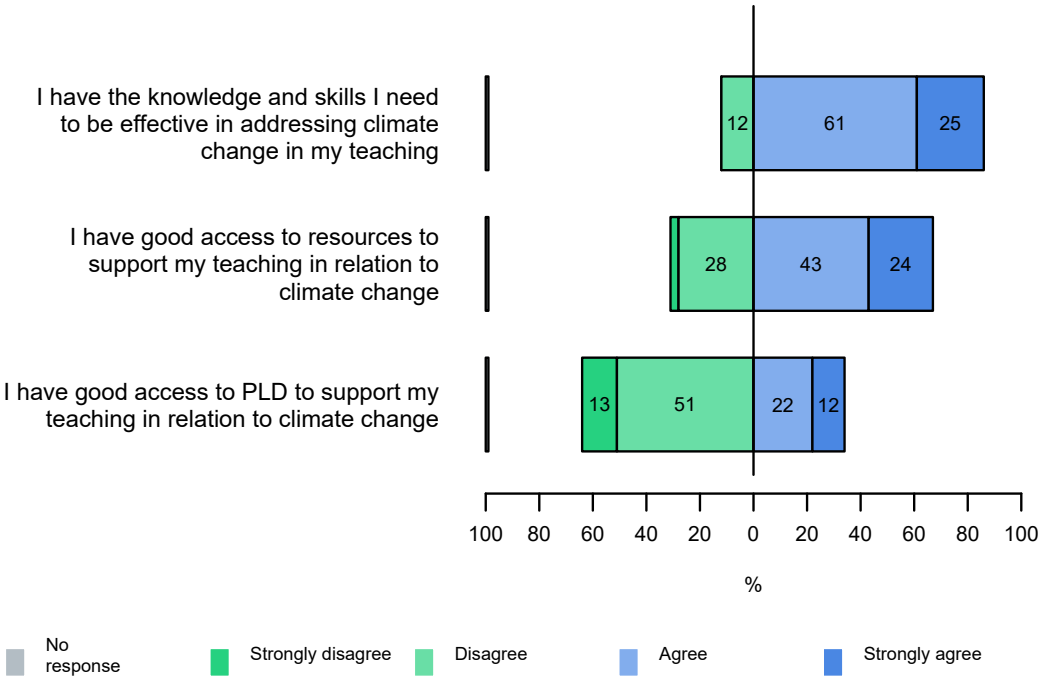
One teacher had taken a break from teaching to undertake further academic studies in relation to climate change.

> I could no longer hold the cognitive dissonance of knowing how much there is to do, and how little the system is changing so far and how firmly current structural constraints hold back teaching innovation in our system.

Resources and teaching supports

Most teachers (87%) expressed confidence that they have the knowledge and skills they need to be effective in addressing climate change in their teaching. Fewer felt they had good access to resources to support their teaching (67%). Just 34% said they had good access to PLD to support their teaching (see Figure 10).

FIGURE 10 **Support and resources for teachers (n=67)**



New Zealand and international resources

We gave teachers a list of 25 New Zealand resources and seven international resources they may have used to support teaching and learning about climate and sustainability. The most commonly used New Zealand resources are shown in Table 13, and the most commonly used international resources are shown in Table 14.

TABLE 13 **The 10 most commonly used New Zealand-based resources (n=67)**

	% Have used
Local and/or regional council resources and/or data	45
Enviroschools resources	40
Education for Sustainability (EfS) resources on TKI	34
NIWA: Climate change information for climate solvers	34
NZ Forest & Bird: Resources	34
Expert people you have access to	34
Department of Conservation (DOC) educational resources	31
Science Learning Hub: website and resources	25
Facebook groups for teachers/educators	25
Subject associations	22

Fewer teachers had used other New Zealand resources such as the Ministry for the Environment's website (19%), Iwi- or marae-based people or resources (18%), Manaaki Whenua Landcare Research (16%), Royal Society Te Aparangi (10%), the Ministry of Education's Guidelines for sustainability teaching in Years 11–13 (13%), the recently published *Climate Change Learning Programme* Level 4 resource (10%), and *Pūtātara, sustainability and global citizenship* for Levels 4–5 (10%).

TABLE 14 **International resources used (n=67)**

	% Have used
The UN Sustainable Development Goals (SDGs) and related resources	34
NASA: Global Climate Change—vital signs of the planet	31
The Story of Stuff project	30
WWF: Understanding Climate Change	22
NOAA Climate.gov	12
Climate Change Connection: Resources for schools	6
GLOBE	2

A few teachers named other New Zealand and international sources and resources they had used, including news articles, documentaries, a range of other resources produced by different organisations, and local/regional expertise networks. One teacher noted that "we go looking for resources to support an approach rather than build our approach around the resources". A few teachers commented about the value of seeing the list of resources we asked about in the survey.

> It's great to see all of these resources, many of which I didn't know and so having PD around this could be really valuable.
>
> Looking at the list [of resources] above, I believe we need time to explore the resources that are already on offer and to have PD around climate change.

Resource gaps and wishlists

Twenty-five teachers described resource gaps and what would be on their "wishlists". Many described specific resource needs to support their students' year level(s), subject/discipline(s), or contexts. This included informational resources as well as practical and "hands-on" tools and approaches.

> A tool to measure their carbon footprint that is relevant to NZ students and their lives, and includes ways to reduce their emissions.
>
> It would be great to have Visual Art resources relating to climate change.
>
> I have identified a lack of educational resources around regenerative agriculture and local food systems
>
> Resources on food waste, it's a huge problem and students should learn how to reduce food waste.

Some teachers wanted more resources to support Māori concepts and principles.

> Resources based around tikanga and mātauranga.
>
> Business responsibility and sustainability—also linking with Māori business concepts.

Some wanted other kinds of locally relevant resources, information, or approaches to meet their communities' needs.

> As our course involves place-based learning, it would be great to have specific resources related to [name of region].
>
> As a rural school access to action [was] tried but [it is a] heavily farming area so [was] not viewed favourably, so other ideas needed.

Resources that could support *students* to lead learning in their communities was also suggested.

> Many of our young people are better informed than the adults in their lives. Are there resources around to help and enable our young people to gain the confidence to work with the adults in their lives to increase the sustainability of our communities?

Having access to experts and networks of people and support was also mentioned as useful for both students and teachers.

> More access to climate scientists to come and answer students' questions. More access to city councillors to explain the work they are doing/the planning they are doing to prepare for the future of [name of city] in terms of climate resilience.
>
> It would be awesome to have a group of scientists that visit schools to give talks to classes or year groups. Outside speakers always stimulate students to think outside the classroom.

Finally, teachers identified how their own PLD could be supported.

> Professional learning would be great! Broader discussions about possible approaches to address Climate Change/Sustainability in traditional siloed secondary education

> A subject association for Education for Sustainability would be amazing. And support for other subjects who pick up the EfS standards, some advice on how to integrate into courses in a meaningful way, that would be wonderful.
>
> I would love to have access to specialist in Climate Science, where they give PD in person to a group of teachers who are passionate about this subject. It is important we have access to the latest research and [are] provided this every year as it evolves constantly.

NCEA standards

Twenty teachers had used NCEA achievement standards to assess student learning in relation to climate change and sustainability in the past year. Most teachers named the specific standards they had used (Appendix C). A few identified the domains but not the specific standards. Domains included core science, chemistry, physics, biology, Earth and space science, environmental sustainability, agricultural and horticultural science, home economics, economics, and geography.

Nine teachers wrote additional comments about NCEA in relation to climate change and sustainability. Positive comments included being able to use standards from different subject areas, and being able to apply standards flexibly around open-ended student projects.

> Having open-ended tasks continues to be helpful for students to form work around climate change ideas.
>
> I really like the EfS standards and how easily they interact and build with each other, easy to teach with student-led initiatives.

One teacher noted that having students working on many different projects did mean it was “a little challenging” to mark a range of standards. Several teachers commented that while there were good standards available, the resources to support teaching around these standards had been an issue.

> There are a number of standards available but being in a small school means that there is often not enough time to prepare resources to teach and assess the standards.
>
> Finding resources has been really hard; until a year ago, the links to resources were broken or misdirected on the NZQA website. And there were no exemplars for level 3 until late last year. This has changed recently. But it’s been tough developing courses as there’s little support available.

Three teachers commented on changes they would like to see happen in NCEA.

> There should be more NCEA standards in a range of subjects on sustainability.
>
> I hope the new NCEA review provides more scope for teaching about climate change and sustainability beyond the ESS domain.
>
> In most subject areas the current NZQA NCEA standard matrix and traditional praxis and interpretation of the standards make it difficult to focus on climate change. We need a fundamental change to the faculty structure in high schools and establish cross curricular structures, perhaps cross curricular teams, to construct a holistic learning organisation that can address climate change and the big issues of our time.

Summary

Where climate change is addressed in secondary classrooms, there is often a focus on teaching about scientific causes and impacts, and opportunities to take personal actions. Collective and systemic actions are less likely to be a major focus, although this is emphasised and supported in some classrooms. The least common focus was on student career options and pathways in an economy transitioning to low emissions. While most teachers said they have the knowledge and skills they need to be effective in addressing climate change in their teaching, fewer said they had sufficient access to resources to support their teaching, or that they have good access to PLD in this area. Teachers' resource wishlists also included materials relevant to the specific subjects/contexts for their teaching, localised knowledge and information, and having access to climate science experts and networks of support.

6. Impacts of COVID-19 on thinking and practice

2020 has been dominated by impacts from the global COVID-19 pandemic. New Zealand schools, organisations, and families/whānau were all impacted by periods of disruption, including over 5 weeks of lockdown, during which face-to-face schooling was suspended and all non-essential workers were required to stay home, and additional weeks where special precautions were in place to limit the risks of community transmission. At the time most respondents completed this survey (June to August 2020), face-to-face schooling had resumed and been operating for a couple of months.

Just over half the survey respondents (53%) answered an open question asking whether the COVID-19 pandemic has had any impact on their thinking or practice with respect to climate change. Key themes are summarised in this section.

Seeing the opportunity to make positive changes

The most common theme (29% of responses) was the idea that it has shown the possibilities for making positive changes. These ranged from small personal-level changes, to within-school changes, and advocacy for system-wide change.

> It did make me appreciate how important it will become to be more self-sustaining (e.g. veggie garden, composting, rainwater storage) and also to look out for my neighbours more.
>
> Yes, it has made me realise that we need to take more action in our school around our sustainability, we need to lead by example. Which is why we have applied for funding from the MOE Sustainability Contestable Fund (and been granted it) so that we can reduce our amount of waste to landfill.
>
> Yes, I believe the pandemic has given us a great opportunity to rethink our economy and way of life as humans. People need to take action to influence governments to change policies that will have a positive impact towards a more sustainable wellbeing.

Some said they had been helping students and/or colleagues to make connections around climate change in their conversations.

> It has demonstrated that culture and societal/behavioural norms CAN change very rapidly when faced with imminent challenges. I'm trying to show that climate change is also an imminent threat, but that we can change and adapt to help reduce the impacts we are already starting to see.
>
> I model to students how adults don't have it all sussed but that we can be calm, rational and caring during such uncertain times. Students are somewhat heartened by the reduction in CO_2 etc due to the pandemic, and certainly proud of our government's leadership in NZ.

One person commented that COVID-19 has "widened the Overton window"[13]:

> I have noticed that colleagues and students are more willing and open to discussions around things like alternative economies, and how societies respond to crises

Short-term environmental gains from lockdown

The second most common theme overall (20%) specifically referred to lowering of pollution levels and/or GHG emissions, and other positive environmental impacts because of the interruption to business as usual during the COVID-19 lockdown.

> It has aroused interest in pollution levels and how the world enjoyed cleaner air. Some [students] are now studying the impacts of this.
>
> The lockdown in some countries has improved the air quality, which highlights how much humans rely on transport.
>
> Significantly reduced traffic movement saw an increase in bird life and marine life.

At least one school had decided to make changes in their future air travel planning.

> The reduction of travel had a positive impact on our school carbon footprint. As a result, any air travel booked through the school in the future (school trips) will have carbon offsetting added at the time of purchase.

New approaches to teaching, learning, and work

A few people identified other benefits of learning/working remotely that they thought were worth continuing. This included normalisation of remote working, and specific ideas about pedagogy and curriculum design that surfaced as a result of COVID-19 experiences.

> Yes it has impacted the way I teach, I am allowing my students to be a lot more self-directed and take responsibility of their own learning. I will also be focusing on the concept of sustainability more.
>
> Certainly some of the work that students produced while working independently and outside of the classroom has helped to reinforce my belief that [education outside the classroom] is a vital part of how we should be teaching.
>
> Yes it has. As a result we are trialing a Year 9 integrated inquiry week. The focus of the week is around how we can flourish in the future.

Other food for thought

A few people talked about how COVID-19 had made them more conscious of other global issues.

> I was just thinking about how the pandemic would affect production and distribution of food.
>
> Not really climate change—but [COVID-19] made me think more about equity.

13 An idea proposed by Joseph Overton, that there is a range of ideas on public policy and social issues considered acceptable by the general public at a given time.

Reduced focus or no impact

A reduced focus on climate change

In contrast to the themes expressed above, 11% of comments suggested COVID-19 had drawn attention away from climate change, or as one put it, “Climate change got COVIDed!”

> It has been hard to think about anything but COVID. I always thought that it would be climate change that would stop us in our tracks, and this came as a complete shock. I have hardly thought about climate change since COVID, except to be aware that it is not getting the coverage it should have.
>
> COVID-19 had the effect of thinking we’ll do whatever we need to [do] to eliminate it, even if it meant burning a whole lot of fossil fuel or creating a lot of waste.
>
> Unfortunately, COVID has stolen the limelight and climate issues appear to be on the back burner.

Some thought there might have been some temporary shifts in thinking and behaviour, but they expected this to be short-lived.

> People’s mindset changes over lockdown but appears to have reverted back to the old ways now we are back to normal.

No change to thinking

Finally, 16% of commenters simply said COVID-19 had little or no impact on their thinking or practice in relation to climate change.

> It has not changed my thinking or thinking of people around me.

Summary

The experiences of COVID-19 has had different impacts on teachers’ and school leaders’ thinking and practice with respect to climate change. Some teachers saw the COVID-19 response as an opening for personal and systemic changes that could make a positive impact on climate change and sustainability, and discussed these ideas with students. Others said COVID-19 had eclipsed all other priorities and thinking, including any attention given to climate change. Some said it had had no impact.

7. Conclusion

The data from this survey provides a snapshot of current thinking and practices around sustainability and climate change from teachers and leaders in a range of English-medium secondary schools. Returning to the overarching research questions for our project (see Summary, p. 1), the findings contribute towards question 2, which is about the extent to which climate change is considered an urgent issue or priority in the education system. For English-medium secondary schools, our data suggests students have some curriculum opportunities to engage with climate change, but what this looks like varies between schools and classes. Many schools are supportive of student leadership in environmental, sustainability, and climate action spaces. Many teachers and school leaders expect climate change will have impacts in their students' lives, and will affect their places and communities in a range of ways. However, climate change and sustainability are not necessarily factored into school-wide curriculum, planning, or operations. The exceptions were a few schools which have a school-wide curriculum design focus around high-level sustainability goals, and people with assigned leadership responsibilities for sustainability across the school.

Secondary schools have many competing demands and priorities, so it is not necessarily surprising that sustainability and climate change are not currently high on the school-wide agenda for many schools. While it is positive that student leadership and learning opportunities are available in most schools, it is worth considering what could support more systematic school-wide embedding of sustainability, and proactive responses to climate change. This survey and other parts of our research suggest the importance of messages "from the top" to signal climate change and sustainability as important priorities across the system, and resources and professional support to assist schools to weave this into school curriculum and operations. Educational leaders at all levels can also be visible in taking on some responsibility to help young people, and society, take steps to reduce the harmful impacts of climate change, and to prepare for changes that will happen. Leaders can help by becoming climate-literate and being "vocal, model leaders within [their] communities" (Clayton et al., 2017, p. 8).

In future phases of our project, we hope to continue to add to this picture with further insights into what effective climate response can look like across a wide range of learning contexts.[14] We will also look at developments and opportunities in wider policy and system planning in Aotearoa New Zealand, including within the education sector, and cross-sectoral government planning. This includes questions about how to support a greater awareness and focus on young people's post-school career opportunities and learning pathways in a low-emissions economy, how climate response action and transition policies can be enacted in line with Treaty of Waitangi obligations and principles (Bargh, 2019), and what can be learned from kaupapa Māori approaches and actions around sustainability and climate change.

14 For a few practice examples, see Bolstad (2020b).

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Appendix A The achieved sample

A sample frame representative of secondary and composite English-medium schools was created to select schools to invite to the survey. Characteristics of the achieved sample are described below.

Decile

Our achieved sample is not representative of decile 1-2 schools, with only two responses received from schools in this quintile. There is a lower than expected proportion of decile 9–10 school, relative to deciles 4–8.

	Quintile 1 (Decile 1–2)	Quintile 2 (Decile 3–4)	Quintile 3 (Decile 5–6	Quintile 4 (Decile 7-8)	Quintile 5 (Decile 9–10)
Percentage of survey responses received	2	21	25	33	20
Sample frame	9	21	25	33	20

School location and type

The achieved sample adequately represents schools by urban/rural location, school type, and presence of school boarding facilities.

	% survey responses	Sample frame
Main urban area	70	78
Secondary urban area	7	7
Minor urban area	21	12
Rural area	3	3

School type

	% survey responses	Sample frame
Composite	5	14
Secondary (Year 7–15)	21	22
Secondary (Year 9–15)	75	64

Authority

Of surveys returned, 83% were from State schools and 16% from State: Integrated schools. Private schools are not adequately represented in the achieved sample, with only one survey response received from a Private school.

Boarding facilities

Twenty percent of responses were received from schools which have boarding facilities.

The impact of unequal response numbers from schools

There was no significant difference in the mean number of responses returned per school, by quintile or urban/rural area.

Appendix B What is focused on in the classroom?

The figures below show 19 things that might be focused on in classrooms where climate change is addressed in teaching and learning. The graphs cluster the items into three broad categories: causes and impacts, science and technology (Figure B1), social, cultural, local, and system impacts and solutions (Figure B2), and actions, meaning, and pathways (Figure B3).

FIGURE B1 **Causes and impacts, science and technology focus (n=67)**

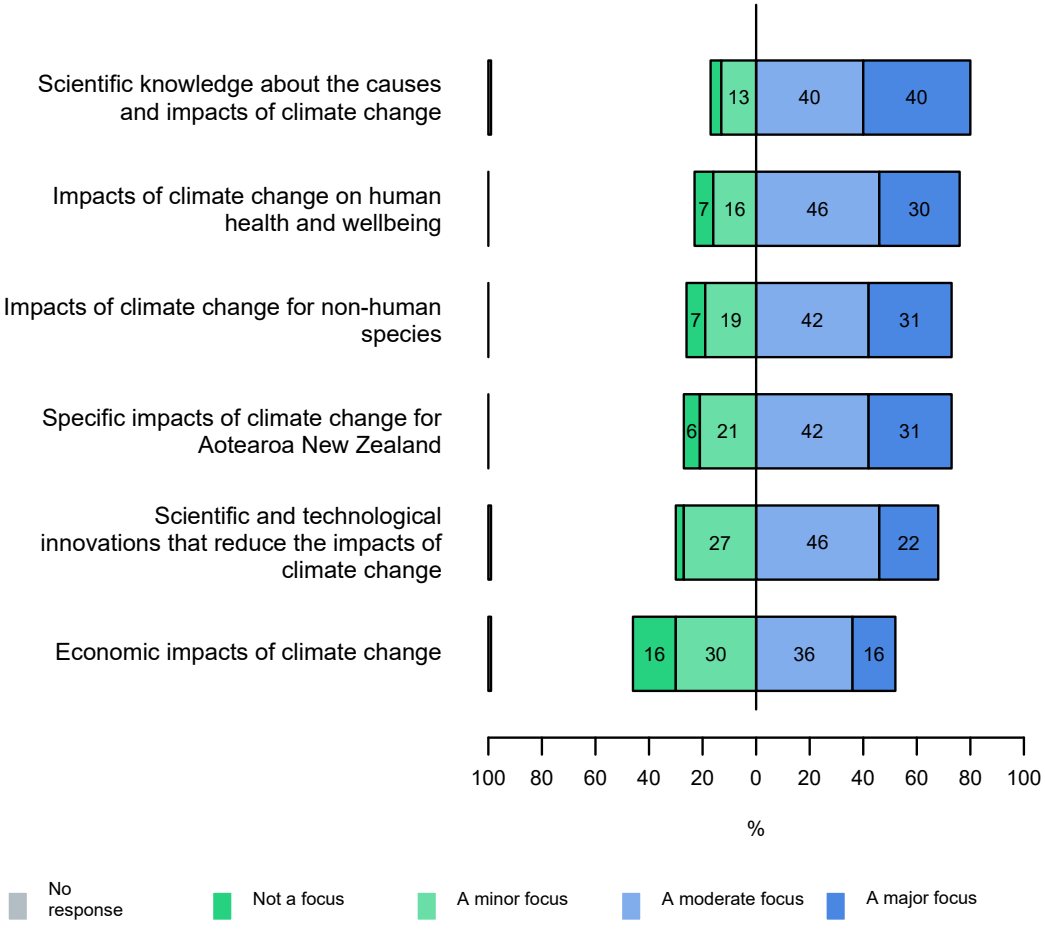


FIGURE B2 **Social, cultural, local, and system impacts and solutions (n=67)**

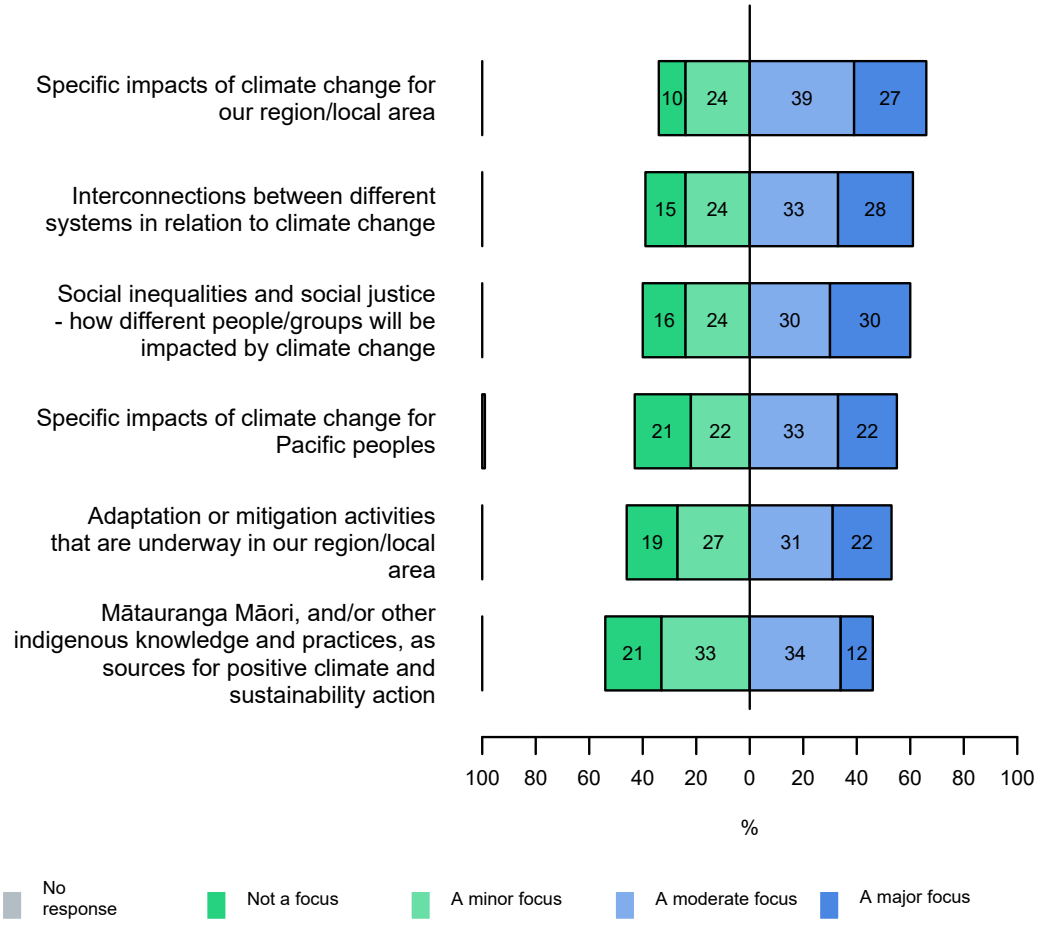
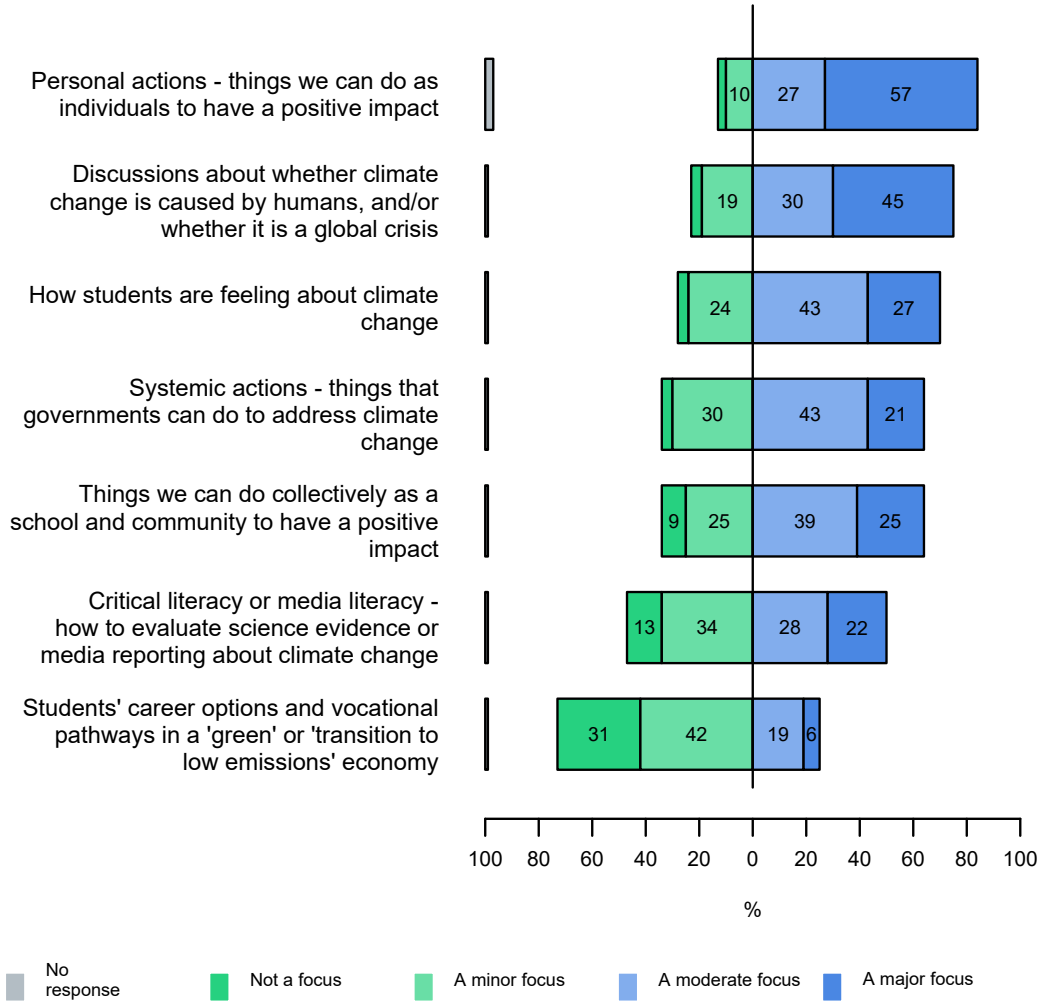


FIGURE B3 **Actions, meaning, and pathways (n=67)**



Appendix C NCEA standards used in relation to climate change

AS		NCEA Level	Domain
90953	Demonstrate understanding of carbon cycling	1	Science—core
90932	Demonstrate understanding of aspects of carbon chemistry	1	Chemistry
90945	Investigate implications of the use of carbon compounds as fuels	1	Science—core
90951	Investigate the biological impact of an event on a New Zealand ecosystem	1	Science—core
90810	Undertake a personal action, with reflection, that contributes to a sustainable future	2	Environmental sustainability
90813	Demonstrate understanding of how different personal values have implications for a sustainable future	2	Environmental sustainability
90814	Demonstrate understanding of aspects of sustainability in different contexts	2	Environmental sustainability
90811	Explain how human activity in a biophysical environment has consequences for a sustainable future	2	Environmental sustainability
91733	Demonstrate understanding of initiatives that contribute to a sustainable future	2	Environmental sustainability
91734	Develop a collaborative response that promotes a sustainable future, in relation to a current issue	2	Environmental sustainability
91188	Examine an Earth and Space Science issue and the validity of the information communicated to the public	2	Earth and space science
91193	Demonstrate understanding of physical principles related to the Earth System	2	Earth and space science
91245	Explain aspects of a contemporary New Zealand geographic issue	2	Geography
91298	Report on the environmental impact of the production of a locally produced primary product	2	Agricultural and horticultural science
91302	Evaluate sustainable food related practices	2	Home economics
91169	Demonstrate understanding of physics relevant to a selected context	2	Physics
90828	Evaluate a personal action that contributes towards a sustainable future	3	Environmental sustainability
90832	Develop a strategy for an organisation that will contribute to a sustainable future	3	Environmental sustainability
90831	Analyse the impact that policies have on a sustainable future	3	Environmental sustainability
91735	Evaluate measures that may be taken to sustain and/or improve a biophysical environment	3	Environmental sustainability
91411	Investigate a socio-scientific issue in an Earth and Space Science context	3	Earth and space science
91414	Demonstrate understanding of processes in the atmosphere system	3	Earth and space science
91413	Demonstrate understanding of processes in the ocean system	3	Earth and space science
91431	Analyse aspects of a contemporary geographic issue	3	Geography
91432	Analyse aspects of a geographic topic at a global scale	3	Geography
91389	Demonstrate understanding of chemical processes in the world around us	3	Chemistry

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