

Cyclone Gabrielle in Hawke's Bay

A Cascading Climate Risk Case Study

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Hawke's Bay, Aotearoa New Zealand

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Cyclone Gabrielle (February 2023)

Understanding how a single extreme weather event triggered cascading ecological, social, and environmental impacts across coastal and catchment systems.

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Cascading impacts of Cyclone Gabrielle in Te Matau-a-Māui, Hawke's Bay: An Illustrated report.

Introduction

Climate change impacts are rarely isolated events. While there is widespread evidence to show the adverse effects of climate change on the environment there is an increased concern of the cascading impacts on economy and society. Increasingly extreme weather events act as triggers that set of chains of interrelated and compounding impacts across multiple areas. The interdependencies give rise to what are known as cascading climate impacts.

Some of these impacts are immediate and easily identified, whereas several other impacts occur over a period and are a direct result of an event – such as intense rainfall, flooding or landladies. These initiate a sequence of secondary and tertiary impacts that propagate across sectors, scales and communities. The impacts and risk often extend well beyond the immediate physical damage caused by the original event, amplifying vulnerability and exposing structural weaknesses in interconnected systems such as ecosystems, food production, infrastructure, governance and social cohesion. In this context, climate risks are systemic rather than linear. Disruption in one domain can destabilise others: environmental degradation can undermine livelihoods; economic shocks can erode community wellbeing; and prolonged recovery pressures can strain governance arrangements and public trust. The cumulative effects of these cascades can exceed the magnitude of the original hazard, particularly where pre-existing vulnerabilities or inequities are present.

Cyclone Gabrielle's impacts in Hawke's Bay provide a clear and contemporary example of cascading climate risk in action. What began as an extreme weather event rapidly evolved into a multi-layered crisis, affecting taonga species and ecosystems, disrupting food production and regional economies, and placing sustained pressure on local governance systems and community confidence. These impacts did not occur in isolation, but rather interacted and reinforced one another over time.

In this report we investigate the ongoing impacts of Cyclone Gabrielle under the categories of Environment – taonga native species like dotterels, the impact on food production, economy and governance. This report is to illustrate and map some of the observable impacts against an established cascading risk framework to support the He Pou a Rangi Climate Change Commission's National Climate Change Risk Assessment.

The evidence collected highlights the importance of understanding climate resilience as a whole-of-system challenge.

Hawke's Bay has long been recognised as one of Aotearoa New Zealand's most productive and agriculturally significant regions. Often referred to as the "fruit bowl of New Zealand," the region's economy is deeply anchored in primary industries, mainly horticulture, viticulture, agriculture and food production. These sectors form the backbone of regional employment, export earnings, and community identity, shaping both the economic and social fabric of Hawke's Bay.

The Hawke's Bay region is defined by fertile soils and distinctive landscapes, characterised by diverse terrain and pockets of microclimates. These conditions create what the wine industry describes as unique *terroir* – a combination of soil, climate, topography, and human practice that shapes agricultural productivity and quality. The expansive flat plains of Heretaunga provide ideal conditions for mechanised farming, scalable production, and efficient land use, while also supporting logistics and infrastructure development.

Hawke's Bay's strategic connectivity further strengthens its role as a primary production hub. Proximity to a deep-water port, regional airport, and rail and road networks enables efficient movement of goods to domestic and international markets. This integrated infrastructure has helped establish the region as a highly favourable environment for horticulture, viticulture, pastoral farming, and food processing industries.

Over generations, growers and producers in Hawke's Bay have developed deep expertise in specific crops, fruit varieties, and livestock systems, refining production practices to suit local environmental conditions. This accumulated knowledge has driven productivity, quality, and global competitiveness. Whether it is Rockit apples, Syrah, stone fruit, hill-country lamb, or mānuka honey, the region has established internationally recognised brands that reflect both environmental suitability and long-term investment in specialised production systems.

However, primary industry is a climate sensitive sector which creates structural fragility. Hawke's Bay's prosperity is closely tied to stable climatic conditions, reliable infrastructure, and functioning ecosystems. Disruption in any one of these elements can reverberate across the regional economy. Extreme weather events, changing rainfall patterns, rising temperatures, and increased frequency of climate hazards pose direct risks to crop productivity, land stability, water systems, and supply chains.

The region's dependency on primary production therefore represents both a strength and a vulnerability. While primary industries provide economic resilience and identity in normal conditions, they also expose Hawke's Bay to disproportionate impacts from climate change. When climate shocks occur, such as Cyclone Gabrielle, the consequences extend beyond environmental damage to affect livelihoods, regional

income, community wellbeing, and governance capacity. This makes Hawke's Bay an acute example of how climate change can amplify existing economic dependencies and transform them into cascading systemic risks.

Hawke's Bay is also home to a range of taonga species that are uniquely adapted to its coastal and riverine environments. Species such as the New Zealand dotterel and diverse seabird populations rely on fragile habitats shaped by dynamic land–sea interactions. These ecosystems hold ecological, cultural, and whakapapa significance, making them not only indicators of environmental health but also integral to the region's identity and resilience.

Cyclone Gabrielle

Cyclone Gabrielle was one of the most severe weather events to affect Aotearoa New Zealand in modern history, with Hawke's Bay experiencing some of the most extreme impacts. The cyclone struck the North Island in mid-February 2023, with its most destructive effects in Hawke's Bay occurring between 13–14 February 2023.

Scale and intensity of the event

The event was characterised by exceptional rainfall, high winds, and widespread flooding across catchments already saturated by months of above-average rainfall. In Hawke's Bay:

- Up to 546 mm of rain was recorded at Glengarry in the Esk Valley during the event.
- Around 400 mm fell within just 12 hours, with peak intensities of 56 mm per hour.
- Other sites recorded similarly extreme totals, with over 400 mm at Pukeorapa and more than 200 mm at Napier Airport.
- In some parts of the region, rainfall reached around 450 mm—equivalent to roughly a quarter of the area's annual rainfall.

These rainfall totals were far beyond historical norms and contributed to catastrophic river flooding, stopbank failures, landslides, and debris flows across the region.

Immediate human, economic and environmental impacts

Cyclone Gabrielle caused widespread destruction across the North Island and was declared a national state of emergency - only the third such declaration in New Zealand's history.

Key impacts included:

- 11 fatalities nationally and widespread displacement of communities. (PHCC, 14 August 2023)

- Destruction of hundreds of homes and devastation of large areas of agricultural and horticultural land. (NIWA, 2023, [In the wake of Gabrielle | Earth Sciences New Zealand | NIWA](#))
- Major infrastructure disruption, including power outages, transport closures, and telecommunications failures. ([New Zealand declares emergency as Cyclone Gabrielle eases | AP News](#))
- Economic losses estimated at up to NZ\$14.5 billion, making it one of the costliest disasters in New Zealand’s history. (As cited in review by Public Health Communication Centre Aotearoa 6 months after the event, [Cyclone Gabrielle by the numbers – A review at six months | PHCC](#)).

In Hawke’s Bay specifically, flooding of the Esk, Tūtaekurī and Ngaruroro rivers inundated floodplains and communities, with debris accumulation exacerbating damage to infrastructure and stopbanks.

Climatic context

Research has shown that climate change intensified the event. A NIWA-led study found that human-induced warming increased total rainfall during Cyclone Gabrielle by approximately 10 percent, amplifying flooding impacts.

Research Approach and Engagement Process

Rationale for Methodology

The extremely short timeframe for designing, conducting, and reporting on this research (January 2026) required a focused and pragmatic methodological approach. The scope and scale of the research were necessarily limited, with data collection restricted to in-depth interviews with individuals who were willing and available immediately following the Christmas–New Year period. Given these constraints, analysis was confined to qualitative thematic analysis, which is well suited to identifying patterns of cascading and long-term impacts in complex social, economic, and environmental systems.

This approach prioritised depth of insight over breadth of coverage, enabling the research team to capture lived experience, sector-level perspectives, and system interactions that are often not evident in quantitative datasets.

Methodology

In-depth interviews were conducted with twelve community stakeholders identified as either directly experiencing, or working closely with people or taonga species experiencing, ongoing impacts from Cyclone Gabrielle. Participants were selected

based on a combination of desktop research and existing local knowledge held by the Sustainable Hawke's Bay research team.

Initial identification of potential participants involved desktop research, including analysis of media reporting and other publicly available indicators that highlighted significant impacts, responses, and leadership roles following Cyclone Gabrielle. This was complemented by the established networks and sector knowledge of Sustainable Hawke's Bay staff, which helped confirm relevance and identify additional stakeholders critical to the study.

Participants were contacted via targeted email outreach and follow-up phone calls to secure their participation. Eleven interviews were conducted face-to-face and one interview was conducted by telephone. Interviews ranged in length from approximately 40 to 70 minutes and were audio recorded for analysis.

A semi-structured interview format was used, supported by a questionnaire designed to ensure consistency across interviews while allowing flexibility for participants to explore issues most relevant to their own experiences. Researchers were free to follow up on emerging themes, clarify points, and probe interconnections between immediate cyclone impacts and longer-term cascading effects.

Prior to engagement, participants were provided with clear information outlining the purpose, scope, and intended use of the research. This included a Participant Information Sheet (Appendix 1), prepared by John Bell, and a Participant Consent Form (Appendix 2). At the commencement of each interview, researchers reiterated the objectives and nature of the research and obtained signed consent.

Audio recordings were reviewed and analysed by the research team using a thematic analysis approach. Key themes were identified across interviews, with particular attention paid to interactions between environmental, economic, governance, and social impacts. These themes, supported by near-verbatim quotations (subject to participant consent), form the basis of the findings presented in this report.

Cascading Impact: Case Study, Interviews and Analysis

1. Environmental Impacts on Taonga Species & Ecosystems

Case study: Impact on Banded Dotterel (*Anarhynchus bicinctus*)

To summarise the impacts of Cyclone Gabrielle on banded dotterels (*Anarhynchus bicinctus*) in Hawke's Bay, with particular emphasis on cascading post-cyclone effects, and to identify management implications relevant to future extreme weather events.

This synthesis draws on post-cyclone monitoring data (Hawke's Bay Regional Council (HBRC), 2024; Landcare Research, 2024) alongside qualitative field insights from an interview with Marilyn Scott, Hawke's Bay coordinator for Pohowera Protection Project, which informed interpretation of post-cyclone predator dynamics, habitat condition, and operational constraints (M. Scott, personal communication, 2026).

Species context

Species: Banded dotterel (*Anarhynchus bicinctus*; Jardine & Selby, 1827)

A small endemic shorebird adapted to open, sparsely vegetated substrates where it relies on camouflage and early detection to avoid predators.

Status: Endemic to New Zealand; conservation status Declining

The species is experiencing ongoing population declines due to habitat loss, predation pressure, and increasing exposure to extreme climatic events.

Habitats: Braided rivers, coastal beaches, estuaries

Banded dotterels occupy dynamic, disturbance-prone environments that are highly sensitive to flooding, sediment movement, and human activity.

Key vulnerabilities:

- Ground nesting on low-lying substrates
- High sensitivity to flooding and predation (flooding can cause direct nest loss while simultaneously increasing predator access and encounter rates in simplified or compressed habitats)
- Reliance on a short, seasonal breeding window

Cyclone Gabrielle: timing and scale

Cyclone Gabrielle impacted the North Island in mid-February 2023, causing widespread coastal inundation, storm surge, erosion, and prolonged flooding, particularly across Hawke's Bay and Gisborne.

Importantly, the cyclone occurred near the end of the breeding season, rather than at peak nesting. At this stage, late-season nests, unfledged chicks, and fledglings were still present, and juvenile survival was critical for seasonal recruitment.

Post-cyclone surveys recorded a 15% regional decline in banded dotterel abundance and a 51% decline within the Tutaekuri River catchment, indicating severe localised impacts despite uneven effects across the wider region (HBRC, 2024).



Figure 1 Marilyn Scott releasing a recently banded fledgling dotterel (2024)



Figure 2 Rodent predation on banded dotterel eggs documented using trail cameras (2024)

Observed impacts

1. Late-season reproductive loss

Flooding and storm surge inundated low-lying nests on beaches, estuaries, and braided rivers. While many early nests had already concluded, late nests, chicks, and fledglings

were highly vulnerable. Mortality at this stage directly reduced juvenile recruitment into the population (HBRC, 2024).

2. Habitat loss and compression

Cyclone Gabrielle caused extensive habitat degradation through erosion, sediment redistribution, burial of coarse gravel substrates by fine sediment, infilling of shallow foraging areas, and accumulation of woody debris and slash.

These processes reduced both the availability and functional quality of nesting and foraging habitat. Remaining suitable areas were fragmented and fewer in number, forcing birds into higher-risk locations and increasing exposure to predators and disturbance during the late breeding and fledging period (Landcare Research, 2024).

3. Predator amplification driven by altered food supply

Field observations following the cyclone indicated a sharp increase in predation pressure, particularly from rats. Floodwaters deposited large volumes of rotting organic material, human food waste, and debris across nesting areas, creating a food subsidy that enabled rapid increases in rat abundance (M. Scott, personal communication, 2026).

In simplified, debris-rich habitats where dotterels were spatially concentrated, predator encounter rates increased markedly. Nest, chick, and fledgling mortality rose even where sites initially survived inundation. Elevated predator pressure persisted beyond the immediate flood period, representing a post-disturbance predation cascade in which flooding indirectly drove reproductive failure through predator population responses.

4. Post-cyclone beach cleanup as secondary disturbance

Post-cyclone cleanup operations, while necessary for aesthetics, public safety and access, generated additional ecological disturbance at many nesting sites. Mechanical debris removal, vehicle traffic, and substrate disturbance reduced residual nesting cover, displaced birds, and disrupted late-season foraging (M. Scott, personal communication, 2026).

In already compressed habitats, cleanup activity further increased exposure to predators and acted as a secondary disturbance, compounding cyclone impacts rather than facilitating recovery.

5. Disruption to food availability

Cyclone-driven sedimentation and disturbance reduced the availability and accessibility of invertebrate prey, particularly in shallow feeding zones used by chicks and fledglings. Reduced food access likely lowered juvenile condition, increased

vulnerability to predation, and reduced post-fledging survival (Landcare Research, 2024).

Cascading effects and longer-term risk

Evidence from New Zealand and international case studies indicates that large flood events can generate multi-year population impacts in ground-nesting shorebirds (Catlin et al., 2011).

Key cascade pathways evident following Cyclone Gabrielle include:

- Late-season reproductive loss
- Habitat loss and spatial compression
- Predator amplification following flooding
- Reduced juvenile recruitment (“missing cohorts”)
- Lag effects emerging one or more seasons after the event

Even when floods occur late in the breeding season, recruitment shortfalls can reduce the number of first-time breeders in subsequent years, slowing population recovery and increasing local extinction risk (Catlin et al., 2011).

Management implications

Cyclone Gabrielle demonstrates that extreme weather events should be treated as population-resetting disturbances, not isolated impacts.

Effective future management should:

- Anticipate post-cyclone predator irruptions, particularly rodents
- Deploy surge predator control immediately following extreme events
- Assess and manage cyclone debris at nesting sites where feasible
- Coordinate cleanup operations to avoid sensitive shorebird habitat
- Maintain late-season and post-season monitoring to detect recruitment failure
- Integrate flood and debris risk into shorebird management planning
- Explicitly plan for post-event capacity constraints, as emergency response demands can limit predator control coverage during biologically critical windows (M. Scott, personal communication, 2026).

Photo/documented evidence (captions):

Marilyn Scott releasing a recently banded fledging dotterel (2024).

Rodent predation on banded dotterel eggs documented using trail cameras (2024).

Key takeaways

Cyclone Gabrielle, although occurring near the end of the banded dotterel breeding season, generated cascading and disproportionate impacts on population productivity

in Hawke's Bay. Late-season reproductive loss, substantial habitat degradation and compression, and a flood-driven increase in predator abundance combined to create a severe recruitment bottleneck.

Importantly, several of the most damaging effects occurred after floodwaters had receded, driven by sustained predator pressure, reduced food availability, and secondary disturbance associated with post-cyclone cleanup activities. These post-event processes amplified initial losses and are likely to produce lag effects through reduced recruitment and altered population structure in subsequent seasons.

As extreme weather events increase in frequency and intensity, shorebird management frameworks must move beyond short-term impact assessments and explicitly plan for post-disturbance cascades, including predator irruptions, habitat simplification, and operational capacity constraints during emergency response periods.

Acknowledgements

The author acknowledges Marilyn Scott, Hawke's Bay coordinator for Save the Dotterels, for sharing field observations and operational insights that informed interpretation of post-cyclone predator dynamics, habitat condition, and management constraints. These insights were derived from long-term volunteer monitoring and on-the-ground experience across coastal and riverine banded dotterel nesting sites in Waipureku, Hawke's Bay.

Following this, we investigate the cascading impact on other areas of the environment in the region. We interviewed participants that supported evidence of this as follows.



Figure 3 Before Cyclone Gabrielle: Clive (source LINZ)



Figure 4 After Cyclone Gabrielle, Clive (source LINZ).

Theme: Environmental thresholds exceeded → permanent landscape change

Evidence from interviews

Phil Barber – Petane Wines

“It was a complete write-off where we were... three rivers just joined, funnelling into the valley.”

“I thought it would be like the 1930s flood... but the water was up around fourteen metres.”

“Once the land’s gone, it’s gone. You’re not just fixing a fence.”

Richard Pentreath – Tukairangi

“When the whenua is damaged like that, it’s not just production that’s affected.”

“This land has been passed down, so what happens to it affects more than just this season.”

Alan Kale – Hawke’s Bay Growers Association (phone interview, handwritten notes)

Alan described extensive environmental impacts outside the direct flood footprint, particularly in coastal cropping areas dependent on pumped drainage. Power outages meant pumps did not operate for several days, resulting in waterlogging and total crop loss even where floodwaters never overtopped land. He also noted uncertainty around soil profiles due to silt layers within paddocks and sediment deposition across growing areas.



Figure 5 Phil Barber owner Petane Wines, at Linden Estate (2026)

Analytical insight (grouped)

Across interviews, environmental impacts are consistently described as transformational rather than temporary. Floodwaters exceeded historical baselines and planning assumptions, resulting in permanent land loss, altered river behaviour, and compromised ecosystems. Alan Kale’s perspective extends this understanding by showing how infrastructure dependencies amplified environmental damage well beyond floodplains. For Māori landowners, these impacts cascade into kaitiakitanga, where damage to whenua disrupts cultural continuity and intergenerational stewardship.

Thematic analysis

Impact on predator numbers

The flooding caused by Cyclone Gabrielle forced predators to move but actually killed very few of them. Rats in particular congregated in high numbers in certain areas, devastating the local bird populations. Lack of access to sensitive ecological areas (e.g. the Kaweka ranges) caused by landslips, halted pest control activities for nearly 2 years during which time predator and pest numbers exploded. Rat, deer, stoat and possum

numbers are still significantly higher than they were pre-cyclone, placing severe stress on many native species, especially birds and lizard species.

Quotes from Tipene

“All our work stopped in the Kaweka’s, the slips on the roads meant we couldn’t get in there to continue our trapping; we didn’t get into some of our trap lines for months”

“For kiwi the work that we do to bring the eggs out, hatch them and take them back, that halted and kinda took a couple of years to get back into full swing”

“Predator numbers just sky rocketed, especially rats... rats survived big time”

“Possums increased significantly, we had stoats increase significantly... while their numbers grow they are having more impact on species and it’s harder to get their numbers down. We’re still trying to get back to what we had before”

Impact on pest control capacity and funding

“A lot of the funding dried up” - Tipene

Funding from Government, councils and charitable organisations to support conservation efforts has declined dramatically as funds have been diverted from conservation to support reconstruction and damage mitigation efforts in other areas (roading, business support, flood protection etc). The impact of this reduced funding will have long-term negative impacts on Taonga species as pest control and species support efforts go unfunded.

Explosion in deer numbers

“I think the biggest impact from the cyclone is feral deer. Their numbers are out of control and they are eating all the vegetation, killing trees by continuously eating the undergrowth. Sika deer are very hard to kil anyway and all the ones we kill are skinny as; starving” – Tipene

“The forest is drying out [from deer browsing]” – Tipene

The cyclone has led directly to an explosion in sika and red deer numbers throughout Hawke’s Bay. In addition to the lack of pest control programmes, access problems caused by landslips has led to a reduction in hunting effort. This coupled with the fact that hunters are going elsewhere to hunt because of the poor condition of the deer (due to food shortages caused by over-population), has caused numbers to increase dramatically. The effect of this explosion in numbers has been the destruction of undergrowth in Hawkes Bay forests and bush, causing massive decline in some plant species, the opening of “light corridors” (where sunlight enters) in the forests which allow pest plant species (unpalatable to deer) to thrive, the drying out of the soil

impacting the soil biome and making the forests less able to absorb water when it rains, leading to further erosion and escalating damage to the forests.

Habitat loss and marine sedimentation

“When all the big trees like big macros and big natives fell down it would have impacted species like that [bats] you never see” – Tipene

“Sedimentation in our estuary is just ridiculous, smothering food sources ... [invasive tube worms] might be the only thing left that native oysters can attach themselves to, to survive” – Tipene

“A lot of people want to do natives [replanting] but the support and advice is for poplar poles and willows ... but if you drive up the Puketitri Road to the Kaweka’s there is only one thing holding those hills together; Kanuka scrub!” - Tipene

Damage from the cyclone included a massive number of landslips which have reduced the amount of habitat available to taonga species. Sedimentation from soil that entered waterways has smothered marine populations in coastal areas, particularly inshore bays and lagoons impacting the marine food chain and ecosystem for years to come.

Forestry slash and the clean-up

“Just how many dotterel nests did those diggers destroy and how many skinks did they squash?” – Tipene

“I have no problem with the wood on the beaches, in fact the skinks were fine, they [people] come and rip it up [the beach]; what are you squashing? Not one thought about the environment apart from cleaning the place up. I would say lizards were hugely impacted and all the little bugs they eat” - Tipene

The highly publicised build-up and subsequent clean-up of forestry and willow slash on the Hawke’s Bay beach front has had serious unintended consequences for taonga species living in the beach shore habitat. While the build-up of woody debris is unsightly and renders the area unusable for people, the fact is that such debris did little harm to the shore living species, and in reality, provided them with shelter (from the elements), protection (from predators and humans) and a source of food (insects that live under the rotting wood). These shore nesting birds, shore living lizards and insects would have been much better off if the debris had been left to decompose naturally. Instead, it was removed thus depriving them of food, shelter and protection, but even worse, the heavy machinery used to “clean it up” destroyed countless individuals and populations of taonga species as they drove over and dug up the beach area without a moment’s thought for the birds and animals living there... “just how many dotterel nests did those diggers destroy and how many northern spotted skinks did they squash?”

Riparian plantings

Many conservation minded landowners and groups in Hawke's Bay had spent years and thousands of dollars establishing riparian plantings of native species along the banks of streams, dams and waterways on private and public land. Cyclone Gabrielle washed away many of those plantings; in many cases it was total destruction with not a plant remaining. Not only did this destroy habitat for native species but it crushed the hopes and dreams of hundreds if not thousands of conservation minded people, rendering their efforts "completely wasted". Many of these landowners and volunteers now question whether they have the energy, will and resources to start again or continue their efforts, and feel that the likelihood of future Cyclones "makes it all rather pointless".

2. Economic Impacts on Local Food Production

Theme: Environmental loss → economic identity loss → forced transition

Evidence from interviews

Phil Barber – Petane Wines

"Obviously the ongoing impact is not having the land, not producing my own grapes."

"The single-vineyard thing was a big part of my brand — that was my passion."

"You spend years building something, and then it's just not there anymore."

Kel Dixon – Shed 530

"Even when you reopen, people assume you're not ready, or they don't come back straight away."

Richard Pentreath – Tukairangi

"Debt and cashflow don't stop just because there's been a flood."

"The pressure doesn't ease just because the water's gone."

Alan Kale – Hawke's Bay Growers Association (phone interview, handwritten notes)

Alan highlighted the scale of financial loss across the sector, noting that many growers had already borrowed heavily to establish crops that were subsequently lost, resulting in a complete loss of direct investment. He emphasised differences between annual cropping systems (where growers could reset) and orchard systems (where recovery timelines are multi-year and psychologically more challenging). He also noted losses of

houses, sheds, and machinery, alongside ongoing pressure from volatile export markets.

Analytical insight (grouped)

Economic impacts extended far beyond immediate revenue loss. Interviewees consistently described loss of identity, certainty, and future confidence. Phil Barber's experience illustrates brand and identity loss tied to land; Kel Dixon's highlights prolonged revenue disruption in hospitality; Richard Pentreath points to ongoing financial obligations within Māori agribusiness; and Alan Kale situates these impacts at a sector-wide level. Together, these insights reveal a cascade from environmental damage into long-term economic fragility across diverse food production systems.



Figure 6 Kel Dixon, Winemaker, Shed 530, Winery immediately post Cyclone.



Figure 7 Kel Dixon, Winemaker Shed 530, Site where the vineyard use to be. (2026)

Thematic analysis

Cascading impacts on orchard growers

Costs

Very significant increases in the cost of insurance, rates and critical redevelopment items such as trees and irrigation equipment. While not always entirely attributable to the impact of Cyclone Gabrielle there is no doubt that some of the increases are due to the costs of the cyclone. For example; a cyclone related component is now a separately identified and significant component of the HDC/NCC/WDC/CHDC/HBRC rates demand. Insurance premiums have increased dramatically for all households and business and this is often directly related to the increased risk Insurance companies associate with Hawke’s Bay land-based businesses. It should also be noted that orchardists are in most instances now unable to insure their trees, trellis and irrigation systems against losses due to weather events. The massive demand for replanting and the redevelopment of orchards led to significant price increases for key equipment simply due to “supply and demand” effects. Noticeably, the cost of these items has not reduced now that demand has slackened.

“Of course, rates and Insurances have gone up hugely” - Paul Paynter

“You pretty much can’t insure most improvements” – Rob Sykes

“It’s important to note that biological assets are not insurable” – Paul Paynter

Financing

Due to their experience with Cyclone Gabrielle, banks are now unwilling to recognise orchard developments (Trees, PVR, trellis and irrigation) as security for loans (note that the cost of such development can now be 3-4 times the value of the land). Banks now appear to be only willing to lend against a heavily discounted value of the freehold land the orchard sits on. This has made refinancing of loans almost impossible for many non-corporate growers, and totally impossible for orchard growers whose business model was to long-term lease land rather than purchase the land. This also has the impact of forcing the sale of family-owned orchards in situations where the family used to maintain ownership of the land while entering into a long-term lease with an orchardist grower who would maintain or redevelop the orchard. These leasing orchardists can no longer borrow to redevelop the orchard so the land-owning family have to sell as there is no one to lease the land. This has caused a significant drop in the price of orchard land and contributed to a change in the ownership pattern of Hawke’s Bay orchards; only corporates and foreign investors are in the market to buy, so family-owned orchards are disappearing.

“The banks just want us to retire debt, I won’t be able to do anything to innovate and grow the business, the end is near. The main impacts of Gabrielle are to balance sheets – more debt and less equity. These are crippling at a time when there is real impetus in remote sensing, unmanned equipment, AI, etc. There is a great deal of productivity enhancing tech, but we cannot fund it.” – Paul Pynter

Rob Sykes

“We are investing more in that land today than the land itself is worth”

“I have funding out of Hong Kong... after the storm they came here, they said there’s nothing left here for us, said I think we should wind it up, we’ve lost it all. That’s what we were going to do before we got the Kanoa loan”

“We had to arrange with our Hong Kong lender a sizeable reduction [of their loan]”

Abandoned orchards

Orchards in the most heavily cyclone impacted parts of Hawke’s Bay (e.g. Esk Valley) have reverted to grazing for livestock, or in some cases just been abandoned. This impacts fruit production in Hawke’s Bay as well as financially devastating the impacted landowners.

“We lost 120,000 apple trees in Esk Valley alone ... we have abandoned those orchards” – Paul Pynter

Rob Sykes

“[Have you abandoned the Esk Valley?] – Yes completely”

“We have taken over [leased] established orchards from people who were walking away [after the cyclone]”

“People still come to me saying; Hi, would you like to lease our land, lease our orchard”

North Island Weather Events Primary Producer Finance Scheme (NIWE)

This Government scheme is hugely appreciated by Hawke’s Bay orchardists and growers; in many cases it was the only thing that prevented their immediate bankruptcy. However, the mechanics of the scheme has left many funding recipients still facing bankruptcy or forced sale three years after the cyclone. The devastation caused by the cyclone meant that banks and other financiers instantly lost their loan security (orchards wiped out, total loss of equipment and land covered in silt etc.). Faced with this scenario financiers considered walking away from their loans and putting their orchard clients into bankruptcy to recover what little they could from their securities. When the government announced the NIWE scheme, financiers were incentivised to “hang in with their clients” in the hope that their security over orchard assets might be recoverable. Orchardists and growers used the loans from the NIWE scheme to recover and redevelop their orchards and farms. The 3-year interest free period of these loans comes to an end for most recipients in 2026-27 at which point they are required to start repaying principal and interest on NIWE loans as well as on whatever bank loans they had pre-cyclone or obtained since. In 2026 their redeveloped orchards and farms (all new trellising, new trees of the latest varieties, new irrigation, new fencing and sheds etc) are still 3-4 years away from full production, consequently the cash-flow from these orchards/farms is insufficient to meet their imminent loan repayments. However, the value of the security that financiers still hold over their clients’ land and equipment etc has now been fully restored, if not increased (basically a brand-new orchard with the most up-to-date varieties and equipment, and a very positive long-term cashflow forecast). Orchardists interviewed told the researchers that their banks and financiers are going to demand full payment of interest due (and in some cases principal as well) or realise their security by forcing the sale of their (fully redeveloped and now valuable) orchards. The banks and financiers can do this because the cashflow from these orchards is still 3 years away from recovering fully and their client are likely to default; their loans are still secured by the orchard assets, and the NIWE loans that paid for the redevelopment are unsecured meaning that the financiers have priority of repayment over the government funded loans.

“When I do the numbers, that doesn’t stack up... I won’t have those trees producing enough to service the loans... we are now trading cash-flow positive but not going to generate enough cash to pay back those loans when they are due” – Paul Pynter

“The banks were pretty close to tipping us over in 2023, if the Government hadn’t come to the rescue, we wouldn’t be here now... hopefully we get to exit with dignity” – Paul Pynter

Rob Sykes

“The funding [NIWE Scheme] was not to be used for working capital, that was a problem and it’s a problem for us right now... [cash-flow] has proved to be a hurdle for us”

“We underestimated the cost of our rebuild... Kanoa [Ministry for Business, Innovation and Employment (MBIE)] came to us and said come back and reapply if we needed to... [but] with the change of Government the fund was closed. That has been a big issue for us and it’s a big issue today”

“To give the guys at Kanoa [MBIE] credit, and by the way, they were amazing... we are eternally grateful that we could use it [NIWE Scheme]”

Employment

Employment in the food production sector declined in the immediate aftermath of the cyclone (no need for fruit pickers and pruning etc.) but increased strongly when orchard and farm redevelopment began. Participating orchardists praised the support they received from the Ministry of Social Development (MSD) and Work and Income New Zealand (WINZ) who made it possible to keep many of their staff employed immediately after the cyclone. Those interviewed did report losing some key employees who moved to other regions and to Australia because they had “had enough and need to get away”, but overall, the employment situation had pretty much returned to normal by 2026.

“[Employment]... We are slightly below pre-cyclone levels. I have had 2 senior people leave, they saw how long it took for Christchurch to bounce back and they thought I can just get on a plane to Australia or the kiwifruit industry where the cash is flopping about” – Paul Pynter

Rob Sykes

“In late 2023-and 2024 we had loads of people employed through MSD”

We have sprayed this money [NIWE Scheme] around Hawke’s Bay. The downstream effect of this money being put into the community has been significant”

Fruit production

In 2023 fruit production was virtually non-existent from orchards impacted by the cyclone. Even fruit still on the trees had to be abandoned due to the risk of contamination. Apple trees that appeared to have survived the cyclone floods continued to die in 2024 and 2025 due to Phytophthora. One participating orchardist estimating losses of surviving trees to be around 10% in 2024, decreasing to 2-5% in 2025. European Canker also devastated some new plantings with one orchardist estimating losses in some new blocks to be as high as 50% in 2025, necessitating a complete replant of the block. One positive impact of the cyclone has been the fact that the forced orchard redevelopments have hastened the move towards new, more valuable apple varieties and new, more productive planting regimes which auger well for the future success of the sector in Hawke's Bay.

Paul Pynter

"We lost over 180,000 trees and over \$10m worth of assets in total"

"We lost 50% of our stonefruit production and haven't recovered [that production]... and we have exited the pear business"

"We've still got issues with phytophthora... its often 2-3 years after an event before you see the worst of that"

"It's not over yet, European Canker, we've seen a high rate of that after the cyclone"

"A lot of the orchards that weren't destroyed were still very compromised, a huge amount of remediation work still going on"

"We are 4000 tonnes of apples and 1500 tonnes of stonefruit short of where we would be if Cyclone Gabrielle hadn't happened... and eight to ten million short in the revenue line"

Rob Sykes

"We will be back in full production in another 3 years, we are currently about 50%"

"All of Hawke's Bay suffered in 2023 with disease, especially black spot, we had a lot"

"2025 was a great crop but only that much [50%]"

"The sheer amount of wetness [flowing the cyclone] allowed the canker to spread... we will have to replace half the new trees [in one block] due to canker"

"We are still getting mortality in blocks that weren't destroyed"

Orchard ownership

The only purchasers of cyclone devastated orchards in Hawke's Bay have been corporates and foreign buyers. Since the NIWE Funding scheme closed these same buyers/owners are the only ones with the funds available to invest in and redevelop orchards, consequently Hawke's Bay has seen an accelerated transition from the traditional family-owned orchard to the corporate owned operation. It is anticipated that this will have future downstream social and economic impacts on Hawke's Bay communities, as well as the loss of institutional knowledge in the apple and stonefruit sector.

Paul Pynter

“[changing ownership from family to corporate] It changes the culture and you lose a lot of experienced heads, losing that talent is a big deal... It strikes me that when businesses are small and connected with their community, they are a benign or positive force. When they are large corporations, they become soulless and unaccountable”

“If you're not a corporate and have deep pockets and access to the capital markets you're in a precarious position. It used to be local bankers making local decisions, now it's mechanical decisions made by computers that is forcing family businesses out of agriculture... Cyclone Gabrielle has exacerbated this”

“[if Cyclone Gabrielle hadn't happened]... absolutely our business would have remained a family business... we would be innovating... we would have extra production, extra profitability more fulltime staff, more total employment more revenue line. When you get behind like that you never quite recover... in our modelling it would be 10 years to get back to where we would otherwise be”

Cascading impacts on beekeepers

- Hawkes Bay beekeepers reported losing more than 7500 hives during Cyclone Gabrielle with thousands more lost in the aftermath due to the inability of beekeepers to reach their hives, to feed them and treat them for varroa mite.
- The devastation of local orchards added further pressure on beekeepers as they missed out on the revenue they normally received for pollination services.
- The American Foulbrood Pest Management Plan Agency believes that hives lost and abandoned due to the cyclone caused a spike in the number of instances of AFB reported in Hawke's Bay.
- The beekeeper participating in this research lost all 450 of their hives to the cyclone when their post-harvest apiary site at Omahu was flooded. Flooding also caused them to lose their hive ware and equipment stored at the same site. It has taken until late 2025 to recommence their operation.

Koro Te Whaiti

“We just happened to have our hives all ready to be extracted, at Fernhill, lost them all [450] it was devastating for everyone... lost the income for the honey not just the hives, a total loss”

“We’re just getting back into it, just now”

- The beekeeper believed that their hives were insured but the insurance company declined their claim; this added considerably to the trauma of losing their stock and their livelihood and delayed their re-entry into the industry.

“Because we had moved the hives they [insurance company] said we weren’t covered, but that’s what beekeepers do - move hives... I would like to raise that [dispute] again even though it’s been 3 years.” – Koro Te Whaiti

- Land slips caused by the cyclone, on accessways to their manuka blocks have not been cleared. There seems no prospect of the tracks being cleared in the short to medium term and thus they are unable to move hives onto what were previously some of their more profitable manuka honey sites.

“We can’t get to our best manuka sites, just ones close to the [main] road” – Koro Te Whaiti

- Their business partner who provided honey harvesting, processing, marketing and technical support was forced into liquidation by their losses in part due to the impacts of Cyclone Gabrielle (“Gabby was the last straw”), so they lost access to expertise, labour support, processing facilities and their sole honey purchaser. The demise of their business partner also left them unpaid for previous honey they had supplied.

“So, we had to find another partner” – Koro Te Whaiti

- Following the loss of their hives and equipment, the owners of the participating beekeeping business took two years evaluating whether it was worthwhile to start up again, eventually deciding it was worthwhile once they had found a suitable replacement business partner.

“We had to look at our risks, be realistic, was this for us... [but we decided] lets pick it up again, we’ve learned from that [the cyclone] we’ve got to keep our waka moving forward” – Koro Te Whaiti

3. Governance and Trust

Theme: Failure of predictive systems → erosion of trust → individualised risk management

Evidence from interviews

Phil Barber – Petane Wines

“The most trust I’ve lost is in weather forecasting.”

“You need to listen to your own voice and not put too much trust in forecasting.”

“I don’t think anyone expected it to behave like that.”

Kel Dixon – Shed 530

“Some of the overseas weather forecasts were more accurate than what we were getting here — even compared to paid local apps.”

“That makes you question what you’re relying on.”

“Council don’t appear to be doing anything about riverbed height increase (thereby decreasing the efficacy of the stop-banks). Dredging of this renewable resource should be permitted.”

Xan Harding – former Hawke’s Bay Regional Council

“A lot of the planning assumptions just didn’t hold under this level of event.”

“Even if there’s a technical explanation that doesn’t always restore confidence.”

“Those systems weren’t designed for what actually happened.”

Alan Kale – Hawke’s Bay Growers Association (phone interview, handwritten notes)

Alan did not identify a sharp new loss of trust in councils, noting that tensions with governance and regulation existed prior to Cyclone Gabrielle. However, he emphasised concern that future climate risk now exceeds existing infrastructure capacity, particularly for bridges, stopbanks, and river systems.

Analytical insight (grouped)

Loss of trust emerged as a shared, cross-sector experience, particularly in weather forecasting and planning frameworks. Phil Barber and Kel Dixon independently referenced overseas forecasts being more accurate than domestic or paid local services. Xan Harding contextualised this erosion at a systems level, while Alan Kale highlighted structural infrastructure constraints. Together, these insights show how governance uncertainty drives individualised risk strategies and conservative decision-making.

Thematic analysis

Cascading impacts on democratic institutions

Interviews with people participating in this research highlighted a lingering hostility towards, in particular, the Hawke's Bay Regional Council (HBRC) as an entity, while they acknowledged that numerous people working for that Council and other institutions, had worked tirelessly, and with great skill and understanding, during the recovery and response to the cyclone.

“Complete and utter fools in my mind” – Dawson Bliss

“Anybody I know despises the council” – Dawson Bliss

Participants recounted incidents where council staff and the bureaucratic processes of councils had delayed necessary remediation, been “hostile” to the efforts of locals during the recovery stage and had been unsympathetic and unresponsive to the needs of impacted individuals and communities. These incidents appear to have created lasting harm to the relationship between residents and the councils. Several participants in the research advocated for the abolition of Regional Councils.

“The HBRC were going to prosecute me for taking some of that slash [from the river]” – Dawson Bliss

Several participants were critical that council reconstruction and flood protection efforts since the cyclone (funded by significant rates increases) did not address the underlying causes of the damage sustained after the cyclone, and would only see a repeat of the same damage the next time a cyclone strikes. They did not “trust the HBRC to get it right for next time”.

“I don't think they're [institutions] going to do any better [next time] than they did last time... I don't think they've learned much at all... I don't trust the Council [HBRC] to help us” – Tipene

“I know people who wanted to sell their land [Buy-out scheme] to make a wetland, but that wasn't an option” – Tipene

“Everyone is talking about floods, fire is going to get us next time... we are not gearing up for other types of emergencies” – Tipene

“Removal of the driftwood left in the Tutaekuri should have been encouraged, they have left it there, it should have been removed” – Dawson Bliss

“There were 8 breaches [of stopbanks] within a few kilometers from here all caused by trees planted or allowed to grow within the flow of the river. They created the turbulence that created the breaches... they still haven’t been removed” – Dawson Bliss

Some participants expressed the view that elected councillors had no power whatsoever and that they were merely there to rubber stamp the decisions of the Council CEO. They suggested that low voter turnouts at the local body elections was the direct result of voters recognising their vote “is worthless” and feeling that a non-vote was “their only way to protest”.

“The elected councillors, they’re just a façade, they’re nothing, it’s the chief executive that pulls all the strings” – Dawson Bliss

On a positive note, a Māori participant and some of the food sector participants believed that the cyclone had “forced councils to come to the table” and to consult with their respective organisations, and that as a result, councils are now more receptive to and better understand their needs.

“There is a lot of co-governance going on which is good” – Tipene

“They [Councils] listen and we work together” – Tipene

“We are working closely with our Council... it’s a good relationship, they know we’re not going away” – Koro Te Whaiti

“The cyclone was a wake-up call for everyone... it’s about all of us working together” – Koro TeWhaiti

All participants who had engaged with the Government organisations MSD, WINZ and MBIE over cyclone related matters were highly complementary and praised both their efforts, and the support they provided.

“To give the guys at Kanoa [MBIE] credit, and by the way, they were amazing...” – Rob Sykes

“DSW – Couldn’t fault them” – Dawson Bliss

“Work and Income – Don’t have any problems with them at all” – Dawson Bliss

Sub-cascading impact: Democratic participation & cost barriers

Evidence (Xan Harding)

“To run a proper council campaign, you’re looking at about twenty to twenty-five thousand dollars.”

“That’s just to have a realistic chance of getting elected.”

“Most people simply can’t afford that.”

“It immediately limits who can put their hand up.”

“You end up with a very narrow group of people who can actually participate.”

Analytical note

Xan reflected that these factors influenced his decision not to stand for council again. He redirected his capacity toward more targeted work on water use and climate adaptation. He also observed a shift from mitigation toward adaptation-focused governance, alongside changes in how councils operate and respond post-cyclone.

4. Cross-Cutting Cascading Impacts (emergent across interviews)

4.1 Mental health and emotional wellbeing

Phil Barber – Petane Wines

“Mental health as well.”

“You go through a grieving process... thinking about what could have been.”

“It takes a long time to come to terms with it.”

Rob Sykes

“One thing that has been underestimated has been the mental toll on people in the [horticulture] industry, not just the owners. I had staff who had to be rescued from the roof of their home... [people] in my business today; we are still struggling”

“I can understand how people have lost their orchard, lost their home; it’s all gone. Mentally it takes its toll and still is”

Alan Kale – Hawke’s Bay Growers Association (phone interview, handwritten notes)

Alan linked mental wellbeing to growers’ ability to reset and plan. Annual cropping systems allowed clearer psychological recovery pathways than orchards, while barriers to formal support limited uptake. Informal peer networks played a critical role.

Analytical insight: Mental health operates as a secondary and tertiary cascade, amplifying economic stress and influencing long-term decision-making across environmental, economic, and governance domains.

4.2 Loss of certainty and future confidence

Kel Dixon – Shed 530

“Even when the water’s gone, you’re still dealing with uncertainty.”

“You don’t really know what the next season looks like.”

Phil Barber – Petane Wines

“I didn’t want to take that risk again.”

“I just didn’t have confidence it wouldn’t happen again.”

Alan Kale – Hawke’s Bay Growers Association (phone interview, handwritten notes)

Alan described widespread depletion of financial buffers, noting many businesses could not absorb another shock of similar scale in the near term.

Analytical insight: Persistent uncertainty led to capital withdrawal, delayed investment, and heightened caution — clear indicators of cascading economic and governance impacts.

4.3 Risk aversion and withdrawal from high-risk landscapes

Phil Barber – Petane Wines

“I don’t know if the government would chip in next time.” (Noting previous government support of approximately \$250,000.)

Kel Dixon – Shed 530

“You start thinking twice about where you put your effort.”

Alan Kale – Hawke’s Bay Growers Association (phone interview, handwritten notes)

Alan observed increased operational caution alongside continued pressure to farm high-risk land due to limited alternatives and land competition.

Analytical insight: This tension illustrates how climate risk reshapes behaviour without necessarily reducing exposure, reinforcing structural vulnerability over time.

5. Positive Cascading Impacts: Social Cohesion & Collective Response

Theme 1: Increased social cohesion and mutual support

Phil Barber – Petane Wines

“The support from the industry was incredible.”

“People really came together to help.”

“I didn’t expect the level of support I got.”

“That side of it was pretty special, actually.”

Xan Harding – former Hawke’s Bay Regional Council

“People really did step up for each other.”

“There was a lot more checking in on one another than you’d normally see.”

“You could feel that people were looking out for their neighbours.”

“It wasn’t just organisations — it was people doing what they could.”

“There was a real sense of ‘we’re all in this together’ for a while.”

Alan Kale – Hawke’s Bay Growers Association (phone interview, handwritten notes)

Growers helped each other during clean-up and recovery, with local advisory and peer networks described as critical.

Analytical insight: Social cohesion acted as a buffering cascade, partially offsetting environmental, economic, and governance stress where formal systems were constrained.

Theme 2: Increased empathy and understanding

Phil Barber – Petane Wines

“People understood what you were going through.”

“There was a lot more empathy than I expected.”

“Everyone had been hit in some way.”

Analytical insight: Shared experience reduced stigma around loss and mental health, enabling more open dialogue and mutual understanding.

Theme 3: Collective identity and shared experience

Kel Dixon – Shed 530

“Everyone was dealing with something.”

“It wasn’t just one business or one person.”

“You realised how connected everything actually is.”

Theme 4: Informal support filling institutional gaps

Alan Kale – Hawke’s Bay Growers Association (phone interview, handwritten notes)

Informal support was often accessed more readily than formal assistance, with some growers choosing peer networks due to complexity or timing of official programmes.

Theme 5: Reframing adversity as opportunity

Phil Barber – Petane Wines

“It opened up opportunities I wouldn’t have had otherwise.”

“I got to work with people I never would have before.”

“There was a positive side that came out of it.”

Kel Dixon – Shed 530 (audio interview)

“You do start thinking differently about the business.”

“It made us strip things back and focus on what actually matters.”

“We’ve changed how we plan events now.”

“It’s made us more deliberate about risk.”

“You don’t just go back to how things were — you rethink them.”

“There’s definitely been learning in it, even though it was painful.”

Analytical note: Kel’s reflections point to organisational learning as a positive cascade — adversity driving operational clarity, revised risk awareness, and changes in how hospitality businesses plan for uncertainty.

Xan Harding – Governance and Systems Perspective (audio interview)

“It shifted my focus.”

“Not standing for council meant I could put energy into things that felt more immediately useful.”

“I’ve been able to work more specifically on water and adaptation issues.”

“There are other ways to contribute that don’t involve being inside the system.”

“It clarified where I thought my time was best spent.”

“It forced some honest reflection about what actually makes a difference.”

“The conversation has shifted — adaptation is now front and centre.”

Analytical note: Xan reframes personal and institutional disruption as strategic redirection. Rather than disengagement, his experience reflects a shift toward targeted, issue-focused contribution, particularly around climate adaptation.

Alan Kale – Hawke’s Bay Growers Association (phone interview, handwritten notes – indicative phrasing)

- Some growers were “able to clean up and make a plan” once immediate recovery was complete.
- Annual cropping systems allowed growers to “reset and start again,” which helped psychologically as well as operationally.

- Vegetable and cropping growers were able to adapt planting decisions and rotations more quickly than permanent orchard systems.
- Over time, many growers returned to business-as-usual, but with greater awareness and caution.
- The sector has become more conscious of where certain crops are grown and how risk is managed.
- Recovery prompted reflection on what is financially viable versus what is simply productive.

Analytical note: Alan’s perspective highlights adaptive decision-making at a sector level, where adversity led to reassessment of crop choices, land use, and risk exposure — even if structural constraints limit how far change can go.

Limitations of the Research

The following limitations are acknowledged in relation to the design, scope, and execution of this research:

1. **Sample size**

Budgetary and time constraints limited the number of participants to twelve. While a larger sample would have increased confidence that all long-term and cascading impacts had been identified, the researchers consider that the participants interviewed were well placed to identify the major impacts. Several participants have previously spoken publicly or professionally on behalf of wider groups or sectors and are therefore considered qualified to reflect both sector-level perspectives and their own lived experience.

2. **Inability to secure interviews with some desired participants**

A number of individuals and organisations were identified as potentially valuable contributors but could not be interviewed due to the timing of the research (January, when many were on leave) and the short data-collection window (approximately two weeks). Specifically, interviews could not be secured with representatives from:

- Department of Conservation
- Heinz-Watties
- McCain Foods
- Ngāti Kahungunu Iwi Incorporated
- The outgoing Chair of Hawke’s Bay Regional Council

3. Inability to independently verify participant claims

Due to time constraints, the researchers were unable to independently verify factual claims made by participants. Statements have therefore been accepted at face value, on the basis that they represent genuinely held beliefs and lived experiences. The report should be read as a qualitative account of perceived and experienced impacts rather than a verified quantitative assessment.

4. Lack of pre-testing of the research instrument

The semi-structured interview format was not pre-tested prior to use. The identification of likely impacts and lines of inquiry was informed by a brief review of published literature on cascading climate impacts, alongside the researchers' existing knowledge of the Hawke's Bay region and community. While pre-testing and a more extensive literature review would constitute research best practice, the researchers do not believe their absence has materially compromised the validity of the findings.

5. Confidentiality and anonymity constraints

As is common in in-depth qualitative research, some participants shared highly personal or commercially sensitive information to illustrate the impacts they were experiencing. In several cases, this information was provided on the condition of confidentiality. Consequently, some material—particularly relating to individual financial circumstances—has been excluded from this report.

6. Inability to quantify impacts

The impacts described in this report are qualitative and anecdotal in nature. The researchers did not have the time or resources to measure or quantify the scale of impacts reported by participants. As such, the findings should be interpreted as indicative of patterns and pathways of cascading impact, rather than as a comprehensive assessment of magnitude.

Appendices

Appendix 1: Participant Information Sheet



Research Project on the Cascading Impacts of Cyclone Gabrielle : Three Years On Participant information Sheet

What is the research project about?

Following the devastating impact of Cyclone Gabrielle, we are investigating the experiences of people and groups in Hawke's Bay, to see whether and if so how, they continue to be impacted by the effects of the Cyclone three years after the event. The research is funded by the NZ Climate Change Commission and a summary of our report will be included in the Commission's report to Government. Our research is funded to focus on three core impact areas ...

- Environmental impacts on taonga species
- Economic impacts on local food producers
- Impacts on local governance, community trust and democratic institutions

What are the Objectives?

- To identify the on-going impacts that specific people, groups and taonga species in Hawke's Bay are still experiencing as a result of Cyclone Gabrielle.
- To understand how these impacts are still affecting them in terms of;
 - o Their health and well being
 - o Their success
 - o Their motivation, energy and plans
 - o Their needs

- o Their level of trust
- o Their ability to prosper

To identify unresolved issues affecting these people, groups and taonga species, attributable to Cyclone Gabrielle.

Who is Conducting the Research?

The project is being carried out by team members from Sustainable HB, for the NZ Climate Change Commission.

Who is Sustainable HB?

Formerly known as the *Environment Centre Hawke's Bay*, we are a registered charitable trust and have been working in the Hawke's Bay community for over 30 years. Our key focus is educating and supporting others to ...

- Build resilient communities
- Carry out environment restoration
- Adapt to and mitigate climate change
- Advocate for systems change and climate disaster preparedness.

Why does this research need to be done?

Three years on from the devastating Cyclone Gabrielle event, some people, groups, communities and taonga species are still being significantly impacted by this event and its effects. While for most people and organisations things have “returned to normal” some people, groups and taonga species have not been so fortunate and their story needs to be heard. This research project is intended to ensure that NZ policy makers, at the highest level, understand that Cyclone Gabrielle set off a series of cascading impacts that three years on, are still harming and hampering the recovery of some sectors of Hawke's Bay.

What does the research involve?

We will be interviewing selected people in Hawke's Bay to hear their story, their thoughts and experiences. The interviews will be face-to-face, and our field researchers will come to see you. We expect that an interview would normally last 30 to 40 minutes.

What happens during an interview and what sort of questions will I be asked?

You will be given information about the research process, confidentiality, and your rights as a participant, and asked to sign a consent form. If you agree, the interview will be recorded using an audio recorder. The interviewer will ask a series of questions and you just need to answer them as best you can. There is no right or wrong answer; just tell the interviewer what you think, or are experiencing, and how you have been impacted.

What are my rights as a participant?

- Taking part is totally voluntary.
- You can decide to stop the interview and not take part in the research, at any time.
- Any material or comments you provide which could identify you personally, or are attributed to you, will be cleared and approved with you prior to their inclusion in the report.
- You will be asked to acknowledge that the information you provide may be included in the report to the Climate Change Commission, and may be included in the Commission's report to Government and thereby may become a document in the public domain.

What happens to the information I provide?

The audio recording of your interview will be analysed by the team from Sustainable HB and key themes identified and reported on. When we would like to include a direct quotation in our report, from your interview, we will get back in touch with you and ask for your approval. All your data will be securely stored by Sustainable HB for 2 years and then destroyed.

How will this research benefit my community?

The findings of this research will inform the development of the both Commission's and the Government's policies and actions on climate change, and their long-term response to severe weather events.

Will I get to see the results?

Yes. All participants will be given a copy of our research report if they would like one. This should be available before the middle of the year.

Who should I contact if I have further questions?

John Bell, Research Manager at Sustainable HB.

Email john@sustainablehb.org.nz

Mobile (021) 620169

Appendix 2: Participant Consent Form



RESEARCH PARTICIPANT CONSENT FORM

Project :

The Cascading Impacts of Cyclone Gabrielle: Three Years On

Project Coordinator and Funder :

This research project is being led by Uttam Floray from Sustainable Hawkes Bay and is funded by the NZ Climate Change Commission

Agreement to Participate in the Project :

- I have read the participant information sheet provided.
- I have had the opportunity to ask questions and seek any clarification I needed.
- I understand the nature of the research and why I have been invited to participate.
- I understand my participation is voluntary and that the time needed is 30 to 40 minutes.
- I understand I am free to withdraw any data traceable to me up to 7 days after participation, without giving a reason.
- I understand that the information I provide may be included in a report to the Climate Change Commission and may be included in the Commission's report to Government, and thereby may become a document in the public domain.
- I understand that that material or comments which could identify me personally or are attributed to me, will be cleared with me and approved by me, prior to inclusion in the report.
- I agree to be audio recorded Yes or No (Please circle)
- Even if I agree to be recorded, I understand that I can ask for the recording to be stopped at any time without giving a reason.

- I understand that data will be kept for 2 years by Sustainable Hawke’s Bay, after which time it will be destroyed.
- I would like to receive a copy of the report ... Yes or No (Please circle)
Email _____
- I know who to contact if I have any questions about the study in general.
- I agree to take part in this research project

Name _____

Signature _____

Date _____