INDUSTRY ROUNDTABLE CONTEXT PAPER

VCCCAR ANNUAL FORUM 2012
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Key points

- Industry sectors across Victoria are already being impacted by weather events made more extreme by climate change. Adaptation can help increase industry’s resilience to further changes.
- Adaptation implementation is not just relevant to managing environmental impacts but needs to be considered in a ‘whole of business’ context.
- Collaborative working relationships between industry, the public sector and researchers are essential to avoid maladaptive responses.
- Industry needs to identify the policy and research options that can best support future resilience in industry sectors.

Adaptation and industry in Victoria: an overview

‘Success in managing climate change does not just depend on national governments, the private sector has a critical role to play.’

— Climate change and security: risks and opportunities for business, IISS, Lloyds 2009

Climate change is already impacting the Victorian private sector directly, due mostly to extreme weather events, and indirectly through flow-on factors such as increasing insurance premiums. Despite this, many businesses still see climate change in terms of the mitigation agenda with its perceived up-front costs and delayed benefits. They appear to have limited knowledge of the role climate change adaptation plays in ensuring future economic resilience in a changing climate. Adaptation is an emerging field of knowledge and practice and, as such, is an area of innovation and growth.

A few sectors known to be highly-sensitive to future climate impacts, such as agriculture and tourism, have already started to assess their risks and explore adaptation options and the opportunities that these offer. Adaptation is being incorporated into the operations of some companies but is mostly viewed in isolated contexts. Climate change is often seen as an environmental risk with little impact on future business sustainability or the economy. The integration of adaptation into current business operations is essential if businesses are to become resilient to a changing climate.

In 2010–11, the Victorian economy totalled $291 billion (Gross State Product [GSP]), accounting for 23.3% of the national economy, with retail trade, health care and social assistance, and manufacturing the largest employing industries. Melbourne is the centre for most of the economic activity in Victoria – hosting 74% of all Victorian jobs in 2006. However, until now, most adaptation research relevant to industry has been undertaken in regional Victoria.

It is important for Victorian industry to identify existing research gaps and options needed to develop effective solutions. In many cases, the exposure of particular industry sectors and locations to changing climate risks has not been identified. Carrying on ‘business as usual’ without factoring in climate change will result in very costly outcomes for some businesses. Industry will also need to identify policies that develop adaptive capacity and thus help avoid costly maladaptive responses.

The industry sector is ideally suited to the challenge of adaptation; it has frameworks for innovation and risk that provide the basis for developing adaptation process and practice. However, this process will also require the formation of working collaborations and communities of practise across industry, research, community and government sectors. Strong leadership will be needed in some areas to enable the transformation of not only individual businesses but the communities that surround them.
What is adaptation?

Many different definitions of adaptation are in use, most revolving around actions and processes. A widely accepted definition of adaptation that accommodates both comes from Smit and Wandel: ‘a process, action or outcome in a system to allow the system to better cope with, manage or adjust to some changing condition, stress, hazard, risk or opportunity.’

Ideally, adaptation is a planned, deliberative process and is not restricted to autonomous changes that happen under reactive management.

Why is adaptation different to mitigation?

Adaptation and mitigation are two related but different aspects of the climate change agenda and are viewed through the perspective of risk management.

Mitigation’s primary focus is to reduce climate change risk by reducing greenhouse gas emissions in the atmosphere through methods such as abatement, sequestration and geo-engineering. It requires a top-down policy process that operates best at the global and national scales and is readily quantifiable.

Adaptation is context and geographically specific and works best at local to regional scales. Its primary focus is to adapt to current climate change impacts and prepare for future impacts. Although adaptation is geographically specific, it has a strong social process component that requires a combination of bottom up and top down processes. An adaptation action needs to be in place long enough to measure its effectiveness. Adaptation is difficult to quantify so is often monitored through qualitative means. Although some aspects can be quantified, such measures are still being developed in the Australian context.

Why does industry need to adapt?

Adaptation is not a new concept. People have been adapting to their changing environments for centuries.

While it is true that humans are an adaptable species, relying on this capacity without planning in a rapidly changing climate is no longer sufficient. A large body of research from around the world is showing that climate change is already impacting on ecosystems, food systems, and on social and economic development. This is also supported by recent evidence from Victoria.

The International Panel on Climate Change (IPCC) projects temperature rises between 1.1 and 6.4 degrees in this century relative to 1980–99. Estimates from Victoria for average temperature rise are 0.9–2.0°C in 2030 and 1.8–3.8°C by 2070.

Victoria is already experiencing the impacts of the changing climate through extreme weather events such as drought, heatwaves and storms. It has also experienced extreme weather-related events such as flooding and bushfires. Recent research shows that the frequency and severity of heat-related and fire events has occurred in an abrupt, step-change manner. This is contrary to the popular belief that these changes are likely to happen gradually. Climate model output shows further sudden changes are likely. For further information of direct and flow-on impacts, please refer to Appendix A.

The recent extreme weather-related events have had a significant economic impact. Figure 1 shows paid insurance claims over 1990–2011 in millions of dollars and as a percentage of Gross State Product (GSP) on the right.

![Figure 1 Weather-related insurance claims for Victoria 1990–2011. Damages in millions of dollars on the left and as a percentage of GSP on the right.](image-url)
In a recent vulnerability assessment for Victoria completed in late 2007, the risks of changing extremes were recognised, but their short-term severity was under-estimated due to the assumption of gradual change in forward projections. If businesses with potential exposure to such risks are to remain financially viable and resilient, they will need to understand how to identify and manage these risks and define and act upon opportunities that these changes offer.

**Case Study 1**

The Murray Goldburn Cooperative was affected by the Victorian drought of 2002–2010 and has experienced flooding (Rochester, January 2011) and bushfires (Keilor 2003 and 2006, Maffra, February 2009). The experience of Murray Goldburn Cooperative employees, and operational systems put in place to cope with climatic variability during these times, have made Murray Goulburn more resilient to the challenges of more severe extreme weather events and resource scarcity that climate change is projected to bring.


**What does this mean for industry?**

Climate change is already impacting businesses around Victoria and some sectors are starting to adapt as a result. All businesses will need to undertake some form of adaptation action in relation to climate change.

There are three types of adaptation action (IPCC):

- **Proactive adaptation** – adaptation that takes place before an anticipated impact is observed. This can also be called anticipatory adaptation.
- **Autonomous adaptation** – this is triggered by ecological changes in either the natural systems or by market or welfare changes in human systems.
- **Planned adaptation** – adaptation that is the result of a deliberate policy decision based on a decision that conditions have changed, or are about to change, and that action is required to maintain or achieve a desired state.

**Risk and adaptation**

Managing climate change risks is an iterative risk management framework that recognises the process of anticipating and responding does not constitute a single set of judgments at some point in time, but rather an ongoing assessment, action, reassessment and response.

Specific components of risk that need to be considered in assessing climate events are:

- Climate events
- Sensitivity to those events
- Exposure of an identity to that event.

Risk related to the implementation of adaptation can also be addressed through innovation frameworks that are suited to the new technologies, systems and processes where outcomes are uncertain.

**Adaptive capacity**

“People need to separate their personal beliefs from their corporate responsibilities.”

— Gareth Johnston

Although the discussion surrounding adaptation for the private sector is mostly about managing climate change impacts, business can play other roles, especially in addressing adaptive capacity. Adaptive capacity is the ability to be successful in a wide range of circumstances. Such capacity relies upon the resources a business has access to and how well these are utilised. Adaptive capacity can be considered in two ways:

1. The capacity of business to adapt in its own self interest
2. The capacity that business can provide to the wider community in adapting to climate change.
How will industry need to adapt?

“No one knows how quickly the climate change will happen or how severe the consequences will be. Companies must therefore build a strategy towards Climate Change into their planning and review their thinking regularly.”

— Climate Change and security: risks and opportunities for business, IISS, Lloyds 2009

The potential for abrupt changes in both climate and exposure requires businesses to assess potential shifts in resource availability and ensure they are able to adapt to rapid change. They will need to embrace new knowledge, technology and frameworks that enable innovative solutions. Existing communication networks and collaborative working relationships within their own and other organisations may also need to be enhanced.

The following core operational areas may need to be modified to ensure future resilience:

- Systems
- Governance
- Knowledge management
- Institutional and communication structures
- Skills and training
- Infrastructure
- Strategy
- Investment
- Risk management
- Resource management.

Risk management and innovation are familiar concepts for the business community; pre-existing frameworks and knowledge of business systems can be tailored to assist with assessing and implementing adaptation. The challenge for most businesses is having the capacity to access and understand relevant research and having the resources to act upon this information.

Because adaptation is contextually and geographically specific, each industry sector will have different needs, requiring the development of sector-specific methods.

At the enterprise scale, most impacts can be incorporated into ongoing planning and business systems. Where adaptive management differs to normal risk management is the type of expertise needed to understand the risks and the longer than usual time-frames involved in planning.

There will also be varying responses. Some climate impacts can be so severe that they require comprehensive responses encompassing both public and private interests.

Which area of business operations will be impacted?

‘Studies have suggested that the economic impacts of unmitigated climate change are likely to be significant. In addition to the expected impacts of climate change are diverse, complex, changing over time, subject to long time frames, often highly uncertain and differ by individual, region and industry.’

— Productivity Commission into Regulatory and Policy Barriers to Effective Climate Change Adaptation, 2012

Primary areas where climate changes are likely to impact businesses are:

- Changing markets
- Logistics and supply chains
- Infrastructure and business assets
- Health and wellbeing of employees
- Industrial processes and business activities, especially temperature sensitive
- Financial – immediate and investment-based transactions
- Associated flow-on costs (eg: insurance)
- Product life and warranties
- Migration of communities either to or from an area (both locally and overseas).
Some climate impacts can be so severe that they can cause system-wide failures resulting in long-term social and economic losses.

**Case Study 2**

A manufacturing business in the Eastern suburbs of Melbourne had a number of buildings with walls that contained asbestos sheeting. During the hail storm in 2010, the buildings were severely damaged. The business was unable to operate for 18 months and suffered considerable financial loss as a result.

**Case Study 3**

After 13 years of drought and higher than usual temperatures, Melbourne experienced record temperatures in late January–early February 2009 (Figure 2). In late January, three days above 40°C led to power brownouts, public transport network failure, crop and animal losses and widespread heat stress in people. On Black Saturday, temperatures rose to record levels, the system failures experienced in ten days earlier returned and catastrophic fires caused unprecedented amounts of damage. Three hundred and seventy-four people died of heat stress, 173 people died in the fires, over 400 were injured and over 2,000 buildings were lost. The fires were estimated to have cost over $4 billion of which $1.3 billion was covered in insurance payouts. The health sector’s service delivery, in particular, was stretched beyond capacity.

**Figure 2** Maximum temperatures measured at Laverton Jan–Feb 2009 showing the heatwave (43.2°C, 44.8°C, 44.8°C) and fire (Black Saturday; 47.5°C) peaks.

**Opportunities**

With all change comes opportunity and adaptation is no exception. Some opportunities are already apparent and others will emerge over time, affecting markets in some areas.

One main opportunity is in the supply of goods and services for households, government and other businesses to adapt. Emerging markets in low carbon–climate aware products and services that integrate adaptation and mitigation concerns are especially relevant. These will be benefitted by certification and quality assurance programs.

Service industries assisting adaptation include:
- Training and up-skilling
- Research and consulting
- Communication
- Knowledge brokering
- Monitoring and evaluation
- Resilient infrastructure
- Development of new technologies.
Some products will be disadvantaged by climate change although the services they represent are essential. Businesses may need to broaden their focus beyond a specific product to the services associated with that product. For example, the water supply and water products industry has moved from a commodity-based water supply model to one of quality and service. The energy sector is making similar changes and others are likely to follow.

**Policy context**

“We have to be extremely creative to create the right enabling environment, legislation and policies to be sure we can work with the private sector in a different way.’

— Diezani K Alison, Maduke Minister of Petroleum Resources of Nigeria, World Economic Forum Annual Meeting 2012

**Federal context**

Australia’s first National Climate Change Adaptation Programme was released in 2005. A Council of Australian Governments (COAG) national climate change adaptation framework in 2007 led to creation of the National Adaptation Flagship in CSIRO, a Community Climate and Earth System Simulator under CSIRO and the Bureau of Meteorology and the National Climate Change Adaptation Research Facility (NCCARF) centred at Griffith University. The NCCARF has developed eight adaptation research plans for sectors and key resources and is carrying out a comprehensive programme of research. An Australian Centre for Adaptation was also established within federal government and funds a wide range of projects in priority areas.

In 2010, a new national adaptation strategy was published (DCC, 2010): *Adapting to Climate Change in Australia: An Australian Government Position Paper*. National adaptation priorities were listed as:

- coastal management
- water
- infrastructure
- natural systems of national significance
- prevention, preparedness, response and recovery with regard to natural disasters, and
- agriculture.  

This also included the commissioning of a *Climate Futures Report* every five years to evaluate the status of adaptation activity and evaluate the effectiveness of adaptation policy.

National vulnerability assessments have also been produced for coasts, biodiversity, world heritage sites, the national reserve system, and fire regimes. A *National Strategy for Disaster Resilience: Building our nation’s resilience to disasters* has also been tabled by COAG.

However policy is still developing and according to a recent report, ‘there would appear to be a considerable implementation gap between the identification of cities as a priority theme and the extent of federal support for adaptation policy development.’

Although there have been a few isolated research activities, research in the private sector has not been addressed methodically. Policy indications are that the private sector should be responsible for resourcing its own adaptation and public policy aspects of this have yet to be comprehensively addressed. The current investigation of barriers to adaptation being conducted by the Productivity Commission will help address this gap.

**State context**

The *Climate Change Act* was passed by the Victorian Parliament and came into effect on 1 July 2011. Outlined in this Act was the development of a State Adaptation Plan. A review of the act was completed in 2012. In response to the view the government retained the adaptation plan with some amendment. The plan is currently being developed and will include:

- Allocation of ownerships of risks between private sectors
- Coordination across government activities.

This raises a key question for industry as to who is responsible and how are they responsible?
Key initiatives include:

- Victorian Climate Change Adaptation Program (VCCAP) was an initiative under the Victorian Government’s Sustainability Action Statement (2006), which included actions for understanding the potential impacts of climate change and developing Victoria’s ability to respond.¹¹

- The Victorian Centre for Climate Change Adaptation Research was established in September 2009 to support the Victorian Government’s other climate change investments and programs, by helping the Government address knowledge gaps and build on existing capacity and learning.

Development of implementable policy that supports the transformation of industry is important for effective adaptation. Adaptation is challenging and maladaptation, ‘an adaptation that does not succeed in reducing vulnerability but increases it instead’ (IPCC, 2001, p. 990), can occur if decisions are not well informed.¹²

The following areas will need to be considered to assist the development of effective adaptation policy:

- Cost-effectiveness of actions
- Distribution of costs
- The support and resources needed to achieve effective actions.¹³

**Adaptation research**

Adaptation is an area of innovation. Much of the knowledge, learning and identification of industry needs is being generated by practitioners in the field. Extensive collaboration is needed to integrate responses to climate change into business systems and models. Active engagement of researchers with stakeholders from the outset, especially with end-users, will help ensure the relevance and usability of research findings.

Currently, funding models tend to promote projects initiated by researchers, although they usually stipulate that decision-makers be involved to ensure that findings are taken-up. These models are best suited to research where public policy-making is a major aim. However, the focus of adaptation research is moving towards action-oriented research centered on stakeholder-driven issues. For example, industry may identify potential measures to assess adaptation effectiveness within specific business models; industry and researchers then collaborate to apply and evaluate such measures using a learning-by-doing approach. Communities of practice will develop through such activities allowing new skills and knowledge to be transferred between businesses and across sectors.

This will require business and researchers to identify synergies and to develop a common understanding that incorporates and respects their different areas of expertise. Although changes to public policy may still be a goal, the involvement of business as a central player is absolutely necessary to avoid maladaptive responses.

**Conclusion**

‘Our very survival depends on our ability to stay awake, to adjust to new ideas, to remain vigilant and to face the challenge of change.’

— Martin Luther King

Recent costs associated with the impacts of a changing climate are higher than anticipated but accurate current and likely future costs for individual industry sectors are not yet available. Robust approaches to adaptation are needed to ensure the resilience of Victorian industry in the face of further change. Industry will need to identify current research and policy gaps and actively seek support in those areas. It will also need to form collaborative working relations across sectors and institutions to support the development of effective adaptation actions and integration of climate knowledge into business models.

A key opportunity for industry in a changing climate is to help develop the goods, services and capacities needed to help meet the adaptation needs of Victorians and markets demands outside of Victoria.

The key questions for consideration by each industry sector are:

- What are key risks of climate change for your sector?
- How does this fit into your current priorities?
- What are opportunities and barriers?
- What are the research and policy needs for effective future adaptation?
References

1 Industry Atlas of Victoria, Department of Business and Innovation, Victoria, October 2011,
6 Data supplied by Insurance Council Of Australia.
## Appendix A: Climate events – direct and flow-on impacts

<table>
<thead>
<tr>
<th>CLIMATE CHANGE EVENT</th>
<th>DIRECT IMPACT</th>
<th>FLOW-ON IMPACTS</th>
</tr>
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</table>
| **Individual Storm Event** | Damaged and loss of infrastructure and assets  
Disruption to services and production, supply chains  
Endangerment of life, risk of injury  
Potential disruption to energy supply  
Potential communication disruption  
Loss of business services or productivity  
Stress of support services responding to the event | Potential decrease of profit  
Stock loss due to storm damage  
Increase cost to business through insurances and need to replace infrastructure  
Possible increased cost to consumer  
Decrease in some primary resources leading to market shortages |
| **Consecutive Storm Events – eg. some areas in regional Victoria have been flooded three times in 12 months.** | Cumulative damage and loss of infrastructure and assets  
Cumulative disruption to services, supply chains and production  
Possible endangerment of life  
Wellbeing of employees  
Loss of business and reduction of profit  
Disruption to energy supply  
Limited capacity of support services to deal with ongoing events | Increase cost to business through insurance premiums and need to replace infrastructure  
Potential reduction of insurance payouts leading to increased expenditure  
Warranty life of products shortened  
Potential refinancing difficulties for vulnerable industries  
Decrease in business, risk of closure  
Increased cost to consumer leading to less disposable income in some areas  
Associated health and wellbeing issues with employees  
Migration of existing community members to other locations  
Need to upgrade infrastructure |
| **Bushfire** | Damage to and loss of infrastructure and assets  
Disruption to services, supply chains and production  
Endangerment of life  
Loss of business and reduction of profit  
 Destruction of community  
 Destruction of communication | Lack of financial capacity, particularly SMEs  
Increase in insurance premiums for property and liability  
Lack of infrastructure and financial support impacts  
Delayed recovery due to trauma and associated health issues  
Change in market structures  
Migration of existing community members to other locations  
Need to upgrade infrastructure |
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<tr>
<th>CLIMATE CHANGE IMPACT</th>
<th>IMMEDIATE IMPACT</th>
<th>FLOW-ON IMPACTS</th>
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<tbody>
<tr>
<td><strong>Flood (overland)</strong></td>
<td>Damage to and loss of infrastructure and assets</td>
<td>Lack of financial capacity particularly SMEs</td>
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<td></td>
<td>Disruption to services, supply chains and production</td>
<td>Increase in insurance premiums for property and liability</td>
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<td></td>
<td>Possible disruption to energy supplies</td>
<td>Lack of infrastructure and financial support impacts</td>
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<td></td>
<td>Possible endangerment of life</td>
<td>Associated health issues</td>
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<td></td>
<td>Loss of business and reduction of profit</td>
<td>Migration of existing community members to other locations</td>
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<tr>
<td></td>
<td>Destruction of community</td>
<td>Recovery of crops and pastures</td>
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<td><strong>Heatwave</strong></td>
<td>Damage to infrastructure, eg. train tracks</td>
<td>Potential increase in work cover cases</td>
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<td>Disruption to production due to OH&amp;S requirements</td>
<td>Associated health issues</td>
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<td></td>
<td>Disruption to power supplies</td>
<td>Increase of prices with some resources</td>
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<td></td>
<td>Increased energy costs due air-conditioning and cooling costs</td>
<td>Loss of business or reduction of profit</td>
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<tr>
<td></td>
<td>Possible endangerment of health of employees</td>
<td>Asset repair and maintenance costs (road, rail, refrigeration)</td>
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<td>Damage of products eg. food, pharmaceutical products</td>
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<td>Low quality housing residents affected</td>
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<tr>
<td><strong>Drought</strong></td>
<td>Damaged infrastructure, eg. pipes, building foundations</td>
<td>Increase in costs to consumer due to the decrease in some resources such as agricultural sector products</td>
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<td></td>
<td>Potential loss of business or reduction of profit</td>
<td>Decrease in refinancing options, increase in debt</td>
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<td>Water restrictions</td>
<td>Associated health issues</td>
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<td>Degradation of land</td>
<td>Loss of community</td>
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<td>Decrease in agricultural products</td>
<td>Change in consumer needs</td>
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<td></td>
<td>Inability to farm in certain areas</td>
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<td></td>
<td></td>
<td>Migration of existing community members to other locations</td>
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<td></td>
<td></td>
<td>Closure of regional business</td>
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<tr>
<td><strong>Inundation (slow onset)</strong></td>
<td>Devaluation of property</td>
<td>Loss of value of primary assets for some families leaving them more financially exposed</td>
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<td></td>
<td>Damage to assets and infrastructure</td>
<td>Increase in insurance premiums for these areas</td>
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<td></td>
<td>Degradation of land</td>
<td>Inability to farm in certain areas</td>
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<td>Potential legal challenges for damages</td>
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<td>Migration of existing community members to other locations</td>
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<td>CLIMATE CHANGE IMPACT</td>
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</table>
| Consecutive, unrelated climate events – eg, fire then flood | Ongoing damage and loss of infrastructure and assets  
Ongoing disruption to services, supply chains and production  
Possible endangerment of life or wellbeing of employees  
Loss of business and reduction of profit  
Disruption to energy supply  
Potential communication disruption  
Lack of support services to deal with ongoing events | Increase cost to business through insurance premiums and need to replace infrastructure  
Potential reduction of insurance payouts leading to increased expenditure  
Warranty life of products shortened  
Potential refinancing difficulties for vulnerable industries, eg, SMEs  
Changes in consumer behaviour  
Decrease in market demand for some products and increase in others  
Increased cost to consumer leading to less disposable income in some areas  
Associated health issues  
Migration of existing community members to other locations  
Accumulated regional stress threatens livelihoods and governance |