Response Options

SELECTION OF KEY FINDINGS RELEVANT TO THE PACIFIC
From the United Nations **Intergovernmental Panel on Climate Change's (IPCC's)** Synthesis Report. This is the final report in the IPCC's Sixth Assessment Cycle (AR6), integrating all IPCC reports from the past 7 years.

The benefits of immediate global climate action include avoided future damages and reduced adaptation costs

There are practical, effective and low cost actions for adaptation and mitigation that can be taken now

The effectiveness of many adaptation options decreases as temperatures rise

Faster financial support and technology transfer to Pacific Island Countries & Territories is needed to allow increased action

Reducing warming to 1.5°C and below 2°C would require an exceptional increase in global mitigation efforts between 2030–2050

Early action on adaptation and mitigation will be beneficial in both the near and long-term, reducing climate-risks for humans and ecosystems

Some important response options include:

- Providing access to early warning systems, and weather and health insurance for the most vulnerable
- Adapting farming practices and farm water management
- Protecting, restoring and reducing pollution in oceans
- Restoring fish populations
- Increasing protection, accommodation and planned relocation to respond to sea level rise
- Making infrastructure systems more resilient

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Early action on adaptation and mitigation will be beneficial in both the near and long-term, reducing climate risks for humans and ecosystems.*[1] Adaptation actions will benefit Pacific Islanders through reduced vulnerability but cannot prevent all losses and damages.[2] The benefits of immediate global climate action include avoided future damages and reduced adaptation costs.[3] There are adaptation and mitigation actions that can be taken now which are feasible, effective and low-cost.[4]**

SECTOR RESPONSES

Urgent, rapid and far-reaching transitions across all sectors and systems are critical to achieve ambitious adaptation and mitigation outcomes.[5]

OCEANS[6]

Ocean ecosystems can be supported by protection, restoration, ecosystem-based management of ocean resources and reducing pollution and other stressors.**
Protecting and restoring coastal 'blue carbon' ecosystems (e.g., mangroves, tidal marshes and seagrass meadows) could increase CO2 uptake and storage* and protect against coastal erosion and flooding.***7

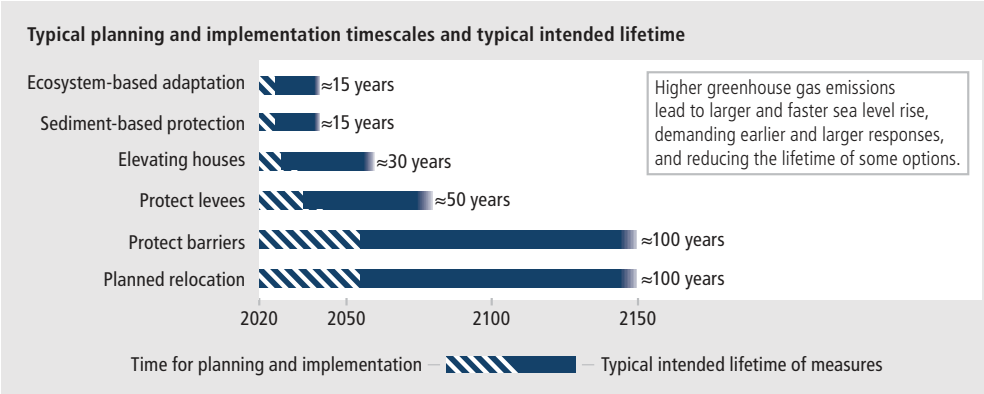
Rebuilding overused or depleted fisheries can reduce negative climate change impacts on fisheries* and support food security, biodiversity, human health and well-being.**

SEA-LEVEL RISE

Sea level rise is a difficult adaptation challenge as it requires dealing with both slow changes and increases in the frequency and intensity of extreme sea level events[8].**
Responses to sea level rise include protection, accommodation, and advance and planned relocation.** These responses are more effective if combined, planned well ahead, aligned with sociocultural values and underpinned by inclusive community engagement processes.**

Sea-level rise can weaken other adaptation responses. For example, wetland restoration benefits the environment and reduces the cost of flood defences*, but loses effectiveness at high rates of sea-level rise beyond 0.5–1 cm per year.*[9]

Responding to sea-level rise requires long-term planning



Adapted from Figure 3.4, panel b) — Responding to sea-level rise requires long-term planning

Higher rates of sea level rise require earlier responses and also reduce the lifetime of measures. As the scale and rates of sea level rise accelerate beyond 2050, long-term adjustments in some locations may be beyond the limits of current adaptation options and for some PICTs and low-lying coasts could be an existential risk.

Adapted from the IPCC report WGII Figure 8.18.

1 Summary for Policymakers (SPM) C.2.1
2 Longer Report Section 4.3
3 SPMC.2
4 SPMC.3
5 SPMC.3
6 SPMC.3.6
7 SPMB6.4
8 Section 3.2
9 Section 3.2

* = medium confidence
** = high confidence
*** = very high confidence

RISK MANAGEMENT[10]

Disaster risk management, early warning systems, climate services and risk sharing approaches provide greater benefits when used together.** Policy mixes that include widespread access to early warning systems, weather and health insurance, and adaptive safety nets reduce vulnerability and exposure of human systems.** These policies need to ensure that the most vulnerable can receive and respond to warnings.**

Flood risks can be reduced by maintaining upstream forests, restoring wetlands and rivers, and land use planning such as no build zones.* Early warning systems can be used together with structural measures like levees and save lives.*[11]

Risks of involuntary migration and displacement due to climate change can be reduced through cooperative, international efforts to improve institutional adaptive capacity and sustainable development.**
Policy interventions can remove barriers and create more options for safe, orderly and regular migration that allows vulnerable people to adapt to climate change.**[12]

LAND AND FOOD PRODUCTION[13]

Climate change and related extremes will affect future agricultural productivity.[14] Effective agricultural adaptation options include: crop improvements, agroforestry, community-based adaptation and diversification.**
On-farm water management, water storage, and soil moisture conservation provide economic, institutional and/or ecological benefits.**[15] However, the effectiveness of most water-related adaptation options declines with increasing warming.**[16]

Agriculture, Forestry and Other Land Use AFOLU mitigation options can deliver large-scale emission reductions and removals and also benefit biodiversity, food security, wood supply and other ecosystem services when sustainably implemented. Examples include: halting deforestation, conserving high-carbon ecosystems, and better management of forests and coastal wetlands. Afforestation can increase land conversion and introduce risks for biodiversity, food and water security, livelihoods and the rights of local peoples, especially if land tenure is insecure.**[17]

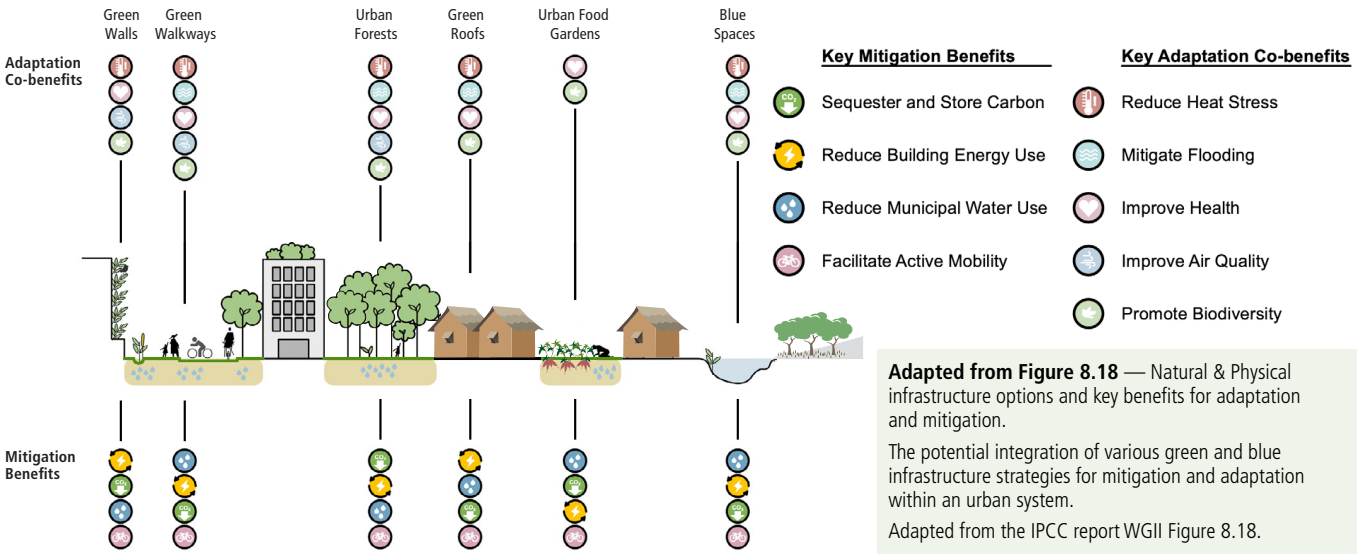
INFRASTRUCTURE AND SETTLEMENTS[18]

Key infrastructure systems including sanitation, water, health, transport, communications and energy will be increasingly vulnerable if design standards do not account for changing climate conditions.**

Urbanisation can be an opportunity to progress climate-resilient development in the near-term.**
Natural infrastructure[19] such as urban forestry, green roofs, and river restoration can mitigate climate change and reduce risk from events such as heatwaves and floods, while also having benefits for health, wellbeing and livelihoods.* Combining natural and physical infrastructure[20] can reduce adaptation costs and contribute to flood control, sanitation, water resources management, landslide prevention and coastal protection.*

Diversifying energy sources via wind, solar and small scale hydroelectricity can reduce vulnerabilities to climate change, particularly for Pacific Island Countries and Territories (PICTs).**[21] However, adoption of these options in the region may be slower due to limitations in finance, technology transfer and capacity.

Natural & Physical infrastructure options and key benefits for adaptation and mitigation.



Adapted from Figure 8.18 — Natural & Physical infrastructure options and key benefits for adaptation and mitigation.

The potential integration of various green and blue infrastructure strategies for mitigation and adaptation within an urban system.

Adapted from the IPCC report WGII Figure 8.18.

10 SPMC.6.3; Section 4.5.6
11 SPMA.3.2
12 Section 4.5.6
13 SPMC.3.5
14 SPMA.2.4
15 SPMA.3.2
16 SPMB.4.1
17 SPMB.6.4
18 SPMC.3.4
19 Also referred to as 'green' infrastructure
20 Also referred to as 'grey' infrastructure
21 SPMC.3.2

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HEALTH AND NUTRITION[22]

A key pathway to climate resilience in the health sector is universal access to healthcare.**

Human health would benefit from integrating health in food, infrastructure and water policies.* ** Public health policies to improve nutrition, such as health insurance and awareness-raising campaigns, can influence food demand, reduce food waste, reduce healthcare costs and contribute to lower GHG emissions.**

Adaptation options that are effective at protecting human health include: Health Action Plans that have early warning and response systems for extreme heat and diseases**, better access to clean water, and protecting water and sanitation systems from flooding and extreme weather events.***

ADAPTATION CHALLENGES

The effectiveness[23] of known adaptation options goes down as temperatures rise.** Above 1.5°C warming, many adaptation options reach limits and become less effective.** For example, above 1.5°C, limited freshwater resources pose potential hard adaptation limits for small islands. Fewer options for adaptation lead to more losses and damages, especially for the poorest, vulnerable groups.

Some adaptation limits have already been reached*[24].** Households in low-lying coastal areas and small-scale farmers have faced soft limits to adaptation.* Some warm water coral reefs, coastal wetlands and rainforests have reached some hard adaptation limits.**[25] Even before reaching these limits, adaptation does not prevent all losses and damages.**[26]

Adaptation options can have hard and/or soft limits. Soft limits arise when no adaptation options are currently available but they might be in the future. Soft limits can arise from financial, governance, or knowledge constraints. Hard limits are when there are no further adaptation options available to reduce risk.

Most adaptation actions have focused on short-term risk reduction which may reduce the opportunity for transformational adaptation.[27] Moving from incremental to transformational adaptation can help overcome soft adaptation limits*[28].** Actions that focus on sectors and risks by themselves and on short-term gains can also lead to maladaptation[29] in the long-term. For example, seawalls can reduce impacts in the short-term, but can also increase exposure to climate risks in the long-term.[30] This can be avoided by thinking of the long-term outcomes of actions and planning for actions to benefit many sectors and systems while being flexible and inclusive.[31] Options include disaster risk management, early warning systems, climate services and social safety nets applied across multiple sectors.**[32] However, the effectiveness of adaptation for long-term climate risk reduction is unknown.

Barriers that constrain the implementation of adaptation options in vulnerable sectors, regions and social groups include lack of finance (including for research), lack of private-sector and civic engagement, slow and low uptake of adaptation science and limited research.**[33] Finance required for both mitigation and adaptation in developing countries remained insufficient in 2018**, below the collective goal under the UNFCCC and Paris Agreement for developed countries to mobilise USD100 billion per year by 2020. [34]

Insufficient finance and the political frameworks and incentives for finance are key reasons for the gap in adaptation and mitigation action.*[35] Faster financial support for developing countries including PICTs is needed to enhance action.***[36] Scaled-up public grants for adaptation and mitigation for PICTs would be cost-effective and have high social returns in terms of access to basic energy.**** Private sector finance for adaptation can be encouraged by public entities addressing real and perceived regulatory, cost and market barriers, for example through public-private partnerships.**

More information on sector-specific response options can be found in the Factsheets on Impacts, Adaptation & Vulnerability at: https://iceds.anu.edu.au/public-policy-outreach/ipcc-pacific/pacific-factsheets

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22 SPMC.3.7
23 Effectiveness refers to the extent to which an adaptation option is anticipated or observed to reduce climate-related risk (Footnote #42 SPM WGII)
24 SPMA.3
25 SPMA3.5
26 SPMB.4.2
27 SPMA3.3; Transformational adaptation changes the fundamental attributes of a social-ecological system in anticipation of climate change and its impacts
28 Section 3.2
29 SPMB.4.3; Maladaption is any action that may lead to increased risk of adverse climate-related outcomes, including via increased GHG emissions, increased vulnerability to climate change, or diminished welfare (SYR AR5 — Annex I)
30 SPMB.4.3
31 SPMB.4.3
32 SPMC.3.8
33 SPMA3.5; Section 2.3.2
34 SPMA.4.5
35 SPMC.7
36 Section 3.4.2

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