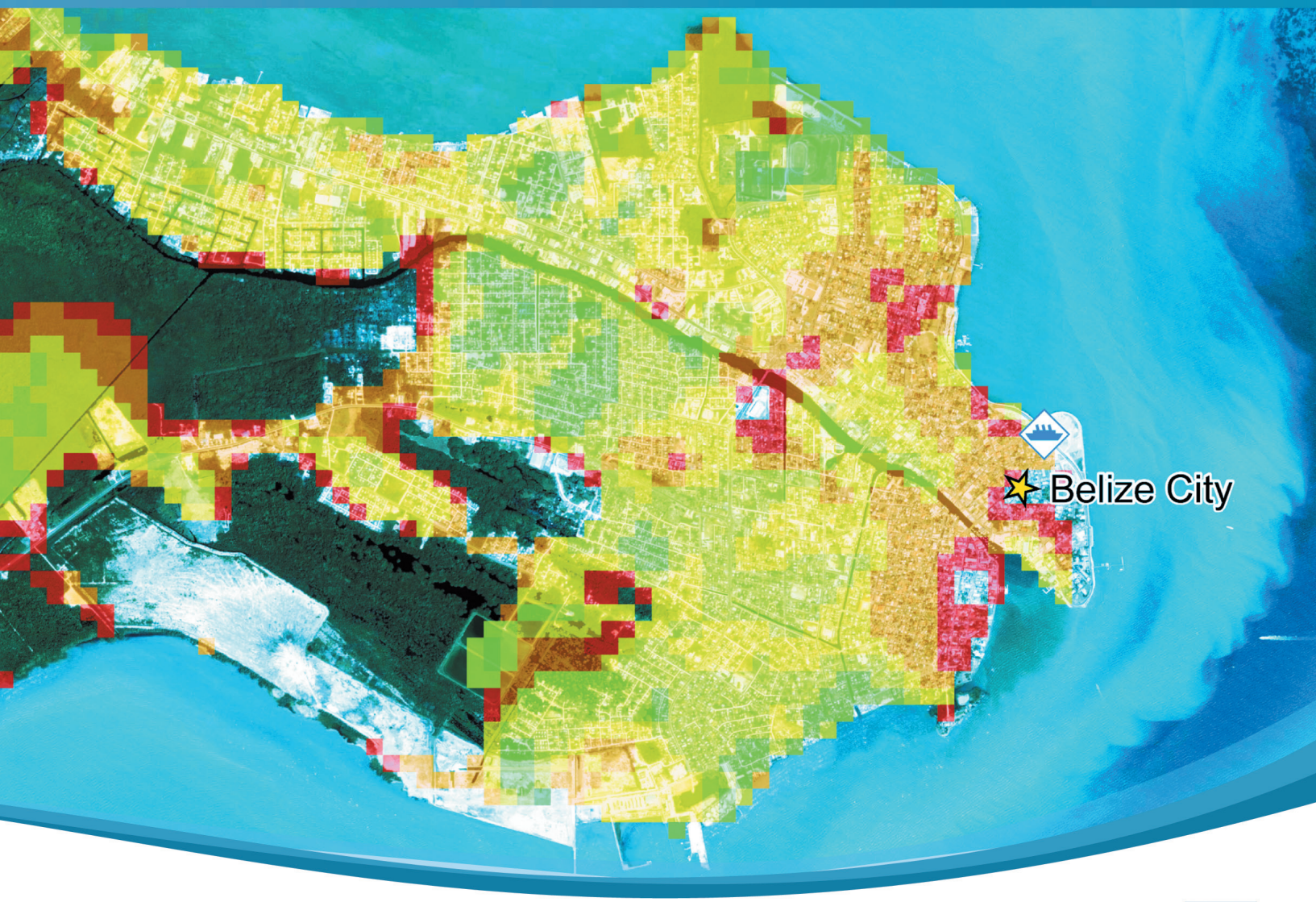
an overview of modelling

CLIMATE CHANGE

Impacts in the Caribbean Region with contribution from the Pacific Islands

KEY POINTS



CARICOM

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An Overview of Modelling Climate Change Impacts in the Caribbean Region with contribution from the Pacific Islands:

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KEY POINTS

Please Note: On the inside back cover of this document there is a DVD with additional information for your use and ease of access. The DVD contains copies of the following:

1.An Overview of Modelling Climate Change Impacts in the Caribbean Region with contribution from the Pacific Islands: KEY POINTS

2.An Overview of Modelling Climate Change Impacts in the Caribbean Region with contribution from the Pacific Islands: SUMMARY DOCUMENT

3.'The Burning Agenda: The Climate Change Crisis in the Caribbean', Short Film (30 minutes) Commissioned by the British Foreign and Commonwealth Office

4.'1.5 To Stay Alive', Song written and performed by the Barbadian performance poet Adisa 'AJA' Andwele.

Introduction

The nations of CARICOM[1] in the Caribbean together with Pacific island countries contribute less than 1% to global greenhouse gas (GHG) emissions (0.33%[2] and 0.03%[3] respectively), yet these countries are expected to be among the earliest and most impacted by climate change in the coming decades and are least able to adapt to climate change impacts. These nations' relative isolation, small land masses, their concentrations of population and infrastructure in coastal areas, limited economic base and dependency on natural resources, combined with limited financial, technical and institutional capacity all exacerbates their vulnerability to extreme events and climate change impacts. Stabilising global GHG emissions and obtaining greater support for adaptation strategies are fundamental priorities for the Caribbean Basin and Pacific island countries. CARICOM leaders recently unveiled their collective position that global warming should be held to no more than 1.5°C[4] and continue to develop a Climate Change Strategic Plan. The Pacific island countries have expressed their priorities for addressing climate change regionally through the Pacific Leaders' Call to Action on Climate Change[5] and the Pacific Islands Framework for Action on Climate Change 2006-2015.[6]

The people of the Caribbean and the Pacific have a long history of resilience to volatile climate conditions. However, the ability of of Caribbean and Pacific island countries to adapt to the likely impacts of climate change is diminished by their exposure to these impacts, and their limited adaptive capacity. The high sensitivity of low-lying atolls to increases in sea level rise (SLR) in particular will threaten water, food security, coastal settlements, health and infrastructure.

This report was commissioned by the United Nations Development Programme (UNDP) Sub-Regional Office for Barbados and the OECS and by the UK Department for International Development (DFID), with support from Australia's International Climate Change Adaptation Initiative. The report was produced by The CARIBSAVE Partnership and authored by members of 15 key institutions around the world dealing with climate change. The 'Key Points' in this document are drawn from the full report which provides an overview for all CARICOM member states of the risks from climate change and includes a section on the common threats of climate change for Pacific island countries. The report focuses on: climate change projections for the Caribbean region under +1.5° and +2°C global warming scenarios; the implications of ice sheet melt for global sea level rise (SLR); the projections and implications of SLR for the Caribbean region; evaluation of the differential impacts of +1.5° and +2°C on coral reefs, water resources and agriculture in the Caribbean, with additional analysis for the Pacific islands.

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1 Members of CARICOM: Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago

2 The Caribbean Islands contribute about 6% of the total emissions from the Latin America and Caribbean Region grouping and the Latin America and Caribbean Region is estimated to generate 5.5% of global CO2 emissions in 2001 (UNEP 2003. See http://maps.grida.no/go/graphic/regional_ differences_in_co2_e missions_latin_ america_and_the_caribbean).

3 According to the IPCC TAR. Cited in: Pacific Islands face up to global warming. http://www.acp-eucourier.info/Pacific-Islands-face-up-t.244.0.html and see Pacific Islands Applied Geoscience Commission (SOPAC), 2007. Funding for renewable energy and energy efficiency projects under the Kyoto Protocol's Clean Development Mechanism, SOPAC Miscellaneous Report 630.

4 The "1.5°C to Stay Alive" campaign. See: http://www.caribbeanpressreleases.com/ articles/5831/1/CARICOM-Unveils-Climate-Change-Strategy-Ahead-of-Copenhagen/Page1.html

5 http://www.pif2009.org.au/docs/call_to_action_final.pdf

6 http://www.sprep.org/att/publication/000438_PI_Framework_for_Action_on_ Climate_Change_2006_2015_FINAL.pdf

The impacts of a changing climate on the Caribbean and the islands of the Pacific are increasingly being manifested in economic and financial losses. According to the World Bank, in 2007 the Caribbean suffered US $10 billion in economic losses from weather related events representing over 13 per cent of gross domestic product (GDP). While there is limited information on the economic impacts of climate change in the Pacific islands, predictions of SLR and other climate related impacts present significant risks to water, food security, coastal settlements, infrastructure and economic development, particularly for those small low lying atoll countries.

The lack of long-term datasets and high-resolution elevation data in the Caribbean region and Pacific islands provides a fundamental barrier to the improved quantification of the impacts of climate change and SLR. There is an urgent need for data collection and investment that would facilitate detailed risk mapping and more accurate evaluations of the impacts of climate change, as well as thorough cost-benefit analyses of different adaptation options and their abilities to cope with different levels of climate change and SLR. This would also help to secure assistance from the international community who are interested in supporting evidence-based adaptation strategies. Despite a significant and evolving effort to understand climate change impacts on small island states and developing nations, there remains the need for further assessment of practical outcomes and approaches that enhance adaptive capacity and resilience. This report provides the first thorough assessment of the consequences of projected SLR and storm surge leading to coastal inundation (+1m to +6m) for the people and economies of the 15 CARICOM nations, gives an overview of the impacts of climate change in the Caribbean region and Pacific islands, and provides recommendations for urgent future work required to enable adaptation to climate change.

Climate Change Modelling Context

OBSERVED TRENDS:

- Temperature trends in the Caribbean over the past 50 years have roughly paralleled observed global warming.
- Sea surface temperature (SST) trends over the Caribbean exceed, and at some locations are nearly double, those being observed over the global tropical oceans.
    - Sea surface temperature (SST) trends across the Caribbean basin over the past 22 years indicate current warming is occurring at 0.2 to 0.5°C per decade.
    - Recent SST increases are greatest throughout the Windward Islands of the Lesser Antilles such as Grenada, Dominica, St. Vincent and the Grenadines and St Lucia.

PROJECTIONS FOR THE 21ST CENTURY:

- Temperature projections for the Caribbean over the 21st century also track global projections.

- Holding global average temperature increases to 1.5°C (above pre-industrial) will similarly restrict temperature increases in the Caribbean.

- Average temperatures throughout the year in CARICOM countries would be approx. 0.5°C warmer at the 2.0°C threshold as compared to that at 1.5°C and perhaps slightly higher at locations remote from the sea.

- Sea surface temperature increases are similar to those for air temperatures over coastal areas and islands. Thus, as with air temperatures, average sea surface temperatures would be roughly 0.5°C warmer at the 2.0°C threshold.

- In most CARICOM countries total annual rainfall is expected to decrease by up to 20% relative to present levels, with larger decreases of up to 30% projected at the 2.0°C threshold.

Sea Level Rise (SLR) Context

- Recent studies accounting for observations of rapid ice sheet melt (Greenland and Antarctic) have led to greater estimates of SLR than in the IPCC AR4 projections.

- Global temperature and the magnitude of SLR are strongly linked.

- With a 1.5°C increase in mean global temperatures the increase in SLR may slow versus recent observations.

- With a 2°C global temperature rise, the rapid increase in SLR will continue.

- Moderate to high GHG emission scenarios pose a major threat to the stability of the world's ice sheets and introduce the possibility of rapid SLR on a decadal timescale up to ten times the rate observed a century ago.

- The Caribbean is projected to experience greater SLR than most areas of the world. Due to gravitational and geophysical factors, the greatest SLR is projected to be along the West and East coasts of North America and SLR in the northern Caribbean may exceed the global average by up to 25%.

- Even in the absence of increased intensity or frequency of tropical storms and hurricanes, SLR will intensify their impact on coastlines in the Caribbean.

- SLR will continue for centuries after 2100, even if global temperatures are stabilized at 1.5°C or 2.0°C and will have major implications for CARICOM nations. This risk must be comprehensively assessed.

Sea Level Rise (SLR) Impacts

- Adaptations to future SLR will require revisions to development plans and major investment decisions, which must be based on the best available information about the relatively vulnerability of specific coastal areas (at spatial resolution).

- The impacts of SLR will not be uniform among the CARICOM nations, with some projected to experience severe impacts from even a 1m SLR. Based on available information, The Bahamas, Suriname, Guyana, and Belize are anticipated to be most severely impacted. Information on the smallest islands is incomplete and vulnerability should not be underestimated.

- **Impacts from a 1m SLR in the CARICOM nations include:**

    - Over 2,700 km^2 land area lost (10% of The Bahamas).

        - Market value of undeveloped land lost is over US $70 billion.

    - Over 100,000 people displaced (8% of population in Suriname, 5% of The Bahamas, 3% Belize).

        - Cost to rebuild basic housing, roads and services (water, electricity) for displaced population approximately US $1.8 billion.

    - Annual GDP losses of at least US $1.2 billion (over 6% in Suriname, 5% in The Bahamas, 3% in Guyana and Belize).

    - At least 16 multi-million dollar tourism resorts lost, with a replacement cost of over US $1.6 billion and the livelihoods of thousands of employees and communities affected.

    - Over 1% agricultural land lost, with implications for food supply and rural livelihoods (4% in Suriname, 3% in The Bahamas, 2% in Jamaica).

    - Transportation networks severely disrupted.

        - Loss of 10% of CARICOM island airports at a cost of over US $715 million.

        - Lands surrounding 14 ports inundated (out of 50) at a cost of over US $320 million.

        - Reconstruction cost of lost roads exceeds US $178 million (6% of road network in Guyana, 4% in Suriname, 2% in The Bahamas).

- **Total Economic Impact of 1m SLR**
  - GDP loss = > US $1.2 billion per year (cumulatively US $30 billion if 1m SLR occurs in 2075).
  - Permanently lost land value = US $70 billion.
  - Reconstruction / relocation costs = $4.64 billion.

NOTE: These figures are based on SLR scientific evidence and do not include other major economic impacts, such as losses in agricultural production, losses in GDP from areas outside inundated regions, costs of changing energy needs, increased storm or hurricane damage and related insurance costs, necessary water supply construction, increased health care costs, or any non-market value impacts.

- **Impacts from a 2m SLR in the CARICOM nations include:**
  - Over 5,700 km^2 of land area lost (17% of The Bahamas).
    - Market value of undeveloped land lost is over US $143 billion.
  - Over 245,000 people displaced (17% of population in Suriname, 8% of The Bahamas and Guyana, 6% Belize).
    - Cost to rebuild basic housing, roads and services (water, electricity) for displaced population approximately US $3.8 billion.
  - Annual GDP losses of at least US $2.3 billion (over 13% in Suriname, 8% in The Bahamas, 8% in Guyana, 5% in Belize).
  - At least 24 multi-million dollar tourism resorts lost, with a replacement cost of over US $2.4 billion and the livelihoods of thousands of employees and communities affected.
  - 3% agricultural land lost, with implications for food supply and rural livelihoods (9% in Suriname, 7% in The Bahamas, 3% in Jamaica and Belize).
  - Transportation networks severely disrupted.
    - Loss of 18 (19%) of CARICOM island airports at a cost of over US $1.2 billion.
    - Lands surrounding 18 ports inundated (out of 50) at a cost of over US $360 million.
    - Reconstruction cost of lost roads exceeds US $406 million (15% of road network in Guyana, 9% in Suriname, 6% in The Bahamas).

- **Total Economic Impact of 2m SLR**
    - GDP loss = > US $2.3 billion per year.
    - Permanently lost land value = US $143 billion.
    - Reconstruction / relocation costs = US $8.2 billion.

NOTE: These figures are based on SLR scientific evidence and do not include other major economic impacts, such as losses in agricultural production, losses in GDP from areas outside inundated regions, costs of changing energy needs, increased storm or hurricane damage and related insurance costs, necessary water supply construction, increased health care costs, or any non-market value impacts.

- **Impacts from a combination of SLR and Storm Surge[7] in the CARICOM nations include:**
    - Over 1 million people found to be at risk[8] to a combination of a 2m SLR and storm surge of 3m from a major tropical storm or hurricane.
    - Land area lost/damaged under 3m SLR/storm surge combination (10,000km^2 or 2% of land area).
    - Land area lost/damaged under 6m SLR/storm surge combination (23,000km^2 or 5% of land area).
    - 460,000 people displaced under 3m SLR/storm surge combination.
    - 1.2 million people displaced[9] under 6m SLR/storm surge combination.
    - 6% GDP lost/disrupted under 3m SLR/storm surge combination.
    - 17% GDP lost/disrupted under 6m SLR/storm surge combination.

Sea Level Rise (SLR) Conclusion

- SLR in the 21st century and beyond, will represent **a serious and chronic impediment to sustainable development of most CARICOM nations.**

7 Storm surge of up to 4m from tropical storms and hurricanes have been recorded in CARICOM nations

8 At risk of flooding

9 Occupied land is permanently inundated

- **The impact estimates *must be considered highly conservative for three reasons:***

    1. Population and GDP remain fixed at recent levels (estimates for 2010 and 2008 respectively).
    2. The coarse resolution of geospatial satellite data available for this analysis masks the vulnerability of coastal infrastructure, natural areas and people to inundation from SLR in some areas (especially small islands with complex topography). Geospatial land use classification data (particularly urban developed lands) is out of date / inaccurate / missing for many areas, but is particularly poor for small islands.
    3. The implications of SLR for accelerated coastal erosion could not be assessed in this study.

- Future studies that use high resolution Digital Elevation Models and that account for erosion and not just inundation are **essential to understand the true magnitude of the threat SLR poses** to the people and economies of CARICOM.

- Addressing this crucial knowledge gap should be a **priority for Development Agencies.**

- CARICOM needs to develop a comprehensive understanding of its long-term risk to SLR in **order to negotiate appropriate adaptation assistance.**

Caribbean Water Resources

- **Water insecurity will increase in most CARICOM nations:**

    - Precipitation (rainfall) levels are likely to decline under climate change – reducing reliable surface water reserves and groundwater recharge to aquifers.

    - Declines in precipitation would lead to an increase in the risk of periods of drought, which are likely to occur more frequently and be more severe.

    - The severity of water resource problems for states which currently have insufficient water resources will have serious repercussions for the livelihoods and health in some communities.

    - For states which currently have sufficient water resources, a decline in precipitation will introduce new water resources problems.

- Reduced groundwater recharge will lead to a reduction in the amount of available water within aquifers, reduce the ability of states to cope with periods of drought and increase the risk of saltwater intrusion to aquifers, particularly in those close to the coast.

- **Sea-level rise will increase the risk of saltwater intrusion into coastal aquifers** (particularly those that are already at risk from over extraction).
    - As little as a 0.1 m rise in sea level can substantially reduce the availability of fresh water in coastal aquifers.
    - Most CARICOM nations have already experienced saltwater intrusion into aquifers.
    - SLR will also increase contamination of coastal aquifers from storm surge.
- A 1.5˚C temperature rise would impact water resources severely in a minority of CARICOM states and be relatively manageable with substantive investment in other states. A global mean temperature rise of 2.0˚C or more will impact severely the water resources in the majority of CARICOM states.

Caribbean Agriculture

- In developing countries and small island states, climate change will cause yield declines for the most important staple cereal crops.
- Climate change will result in additional price increases for the most important agricultural crops – rice, wheat, maize, and soybeans – increasing child malnutrition for the poorest families in developing countries.
- Calorie availability in 2050 will not only be lower than in the no climate-change scenario—it will actually decline relative to 2000 levels in the developing world.
- By 2050, the decline in calorie availability will increase child malnutrition by 20% relative to a world with no climate change. Climate change will eliminate much of the improvement in child malnourishment levels that would occur with no climate change.
- **Average yields in CARICOM countries for three key crops will be reduced** (irrigated and rainfed rice, rainfed maize and rainfed cowpea)– the declines range from about 3% to over 8 %.
- Assuming these yield effects apply to all crops, **agricultural value in the CARICOM countries would fall by between US $85 million per year to $243 million per year.**

Caribbean Coral Reefs

- An **increase in thermal stress on Caribbean coral reefs in the next 20-30 years is inevitable** due to "committed" warming from GHG emissions already in the atmosphere and those that will be emitted before emissions can be significantly reduced.

- Under either the 1.5°C or 2°C warming scenarios, the accumulation of thermal stress on Caribbean coral reefs far exceeds current mass coral bleaching thresholds across the Caribbean. Without any biological adaptation, **the frequency of bleaching events will exceed the rate of recovery.**

- **Adaptation through biological mechanisms and management may allow some Caribbean coral reefs to avoid severe degradation from frequent bleaching events up to a 1.5°C warming.** Such adaptation is uncertain and would come **with other costs such as reduced diversity and productivity.**

- Ocean chemistry changes anticipated when warming of 1.5°C above pre-industrial levels occurs (i.e., ~490 ppm atmospheric CO_2) may remain adequate for reef growth, whereas **at 2.0°C and 550 ppm Caribbean reefs may be eroding faster than they are built.**

    - Under both stabilization scenarios (350 ppm and 450 ppm) chemical conditions would likely be adequate for reef growth but much uncertainty as such conditions may be unprecedented for more than 2 million years.

- **Climate change and ocean acidification at 1.5°C will significantly degrade Caribbean coral reef ecosystems and the services they provide. This will be even more severe at 2.0°C. Beyond 2.0°C many Caribbean coral reefs will not survive.**

    - It is highly unlikely that adaptation through biological mechanisms and management will be sufficient to avoid severe degradation of Caribbean coral reefs from frequent bleaching events and altered ocean chemistry under a +2.0°C scenario.

- The ecosystem services (fisheries and tourism) provided by coral reefs in the Caribbean are valued at between US $1.5 billion and 3.5 US$ billion per annum[10] . A temperature increase of 2.0°C degrees or more will degrade coral reefs at an accelerating rate and result in the rapid loss of these ecosystem services.

Pacific Island Countries

- An additional 0.5°C warming on 1.5°C would likely cause a large increase in the frequency of ***extreme hot spells*** throughout the Pacific region.

- For the 1.5°C warming threshold, ***mean annual rainfall*** is generally projected to increase on the order of 5 to 15% over most of the equatorial Pacific where rainfall is already high. Other areas of the Pacific show lesser increases or even slight decreases in rainfall.

10 Occupied land is permanently inundated

Overall, although impacts of climate change will affect Pacific island countries differently, likely impacts on key sectors such as water resources, agriculture, fisheries and infrastructure are similar to those forecast for Caribbean countries. In particular:

- Projected changes in rainfall, combined with salt water intrusion in water tables, will result in **water scarcity** in a number of Pacific island countries, in particular atoll countries, adding to existing stress from high water demand, poor water infrastructure and limited storage capacity.

- Storm surge and coastal erosion **threaten coastal settlements** and the transport, water and sanitation infrastructure that support them. Potential increases in peak wind speeds and the intensity of precipitation from more extreme tropical cyclones coupled with SLR exacerbate the existing impacts of storm surge and flooding.

- The **consequences for coral reefs at 2°C warming are dire.** A decrease of 75% in coral cover (compared with 30 to 40% under a 1.5°C scenario) will result in **severe declines in the availability of reef-associated fish** and coastal fisheries production, with significant implications for food security for many Pacific nations.

- Although the Pacific region has a strong subsistence heritage, many countries import food staples and are **vulnerable to rising food and energy prices.** Predicted impacts of climate change are likely to increase reliance on imported food, unless adaptation strategies are developed to diversify primary production and broaden countries' economic base.

- Economic impacts of climate change and the costs of adaptation have yet to be assessed comprehensively at the regional and country level to inform national development strategies and investment decisions.

- To **enhance adaptive capacity** in the Pacific region, further efforts are required to assess the practical outcomes of projects and ensure lessons are learned. Capacity building in vulnerability assessment and adaptive planning at the national and local levels are needed, building on Pacific institutions, knowledge and practices.

- Pacific islands have expressed their priorities for addressing climate change regionally through the **Pacific Leaders' Call to Action on Climate Change**, the **Pacific Plan for Strengthening Regional Coordination and Integration**, the **Niue Declaration on Climate Change and the Pacific Islands Framework for Action on Climate Change 2006-2015.**

Recommendations

The following selected recommendations based on the findings of this report should not be taken as exhaustive but are representative of a need for serious, comprehensive and urgent action to be taken to address the challenges of climate change in the islands and coastal states of the Caribbean Basin and the Pacific islands. Concerted global action will be needed to reduce the impacts of climate change on coastal areas of the Caribbean and the Pacific islands. Measures to contain the global temperature rise to 1.5°C by 2100 are an important objective and will reduce projected losses of land, infrastructure, resources and economies. The recommendations have been divided into two categories; 'Improving climate change predictions for informed decisions' and 'Predicting impacts on key sectors and implementing adaptation measures'.

IMPROVING CLIMATE CHANGE PREDICTIONS FOR INFORMED DECISIONS

Recommendation: In order to improve spatial detail and to examine uncertainties more closely, as well as to study changes in extreme climate events (e.g. heavy rainfall, tropical storms), further examination of the projections is recommended including downscaling; any such work would be consistent with the UNFCCC Nairobi Work Programme.

Recommendation: Detailed information on the vulnerability of coastal areas is needed. As the climate continues to change in the coming years, such information will be vital to inform coastal zone management and anticipate flood hazard. It seems likely that any continued global mean temperature increase will have serious consequences for the Caribbean and Pacific islands by 2100, but if the increase exceeds 1.5°C the consequences will be extremely serious in areas of high exposure. A strategy needs to be developed globally by which on the one hand, all nations would agree to curtail global emissions and address environmental degradation. On the other hand, the Caribbean and Pacific island communities themselves would agree to plan for the changes that will increasingly affect their coastlines as a result of increased warming and sea level rise that the world is already committed to from past emissions and climate feedbacks.

Recommendation: In both the Caribbean and the Pacific islands there is a critical need for: a) investment in high-resolution topographic data to facilitate detailed risk mapping of local areas; b) the extension of existing observational and sea-level monitoring programs, and efforts to improve understanding of wind and wave climate in the context of climate change; c) the quantification of the extent of erosion risk associated with SLR; d) a detailed analysis of the capacity of adaptation options to cope with different levels of climate change and associated sea level rise; and e) more detailed costs assessments necessary to inform future negotiations regarding adaptation assistance from the international community.

PREDICTING IMPACTS ON KEY SECTORS AND IMPLEMENTING ADAPTATION MEASURES

Recommendation: Adaptation through biological mechanisms and management may allow some coral reefs to avoid severe degradation from frequent bleaching events and survive up to a 1.5°C warming. Such adaptation is uncertain and, if possible, would come with other costs such as reduced diversity and productivity. In summary, two sets of actions are required for the continued survival of coral reefs:

1) rapid reduction of CO_2 emissions and eventual reduction of atmospheric CO_2 level, and
2) management actions to help corals survive long enough for our actions to attempt to stabilize the climate system.

It is highly unlikely that adaptation through biological mechanisms and management will be sufficient to avoid severe degradation of coral reefs from frequent bleaching events if the temperature increase exceeds 1.5°C above pre-industrial levels. More importantly, most known physiological mechanisms that allow corals to adapt to warmer conditions also cause slower growth, making the problems caused by acidification even more severe. These impacts will be even more severe at 2.0°C.

Recommendation: To better address potential effects of climate change on agriculture, the following data and analyses are needed: a) improved downscaling of climate change scenarios; b) better characterization of the crop varieties, including location specific information on agronomic environments, crop diversification and sustainability of production systems, and; c) more detailed characterization of the agricultural sectors and their roles in economies and alternatives.

Recommendation: There is a need to address predicted impacts of climate change on water resources, including running climate change scenarios through engineering models to determine implications for water supply and treatment especially examining extreme high and low water supply, particularly in areas with increasing populations. There is also a need to improve water infrastructure and water management. In particular, states should a) improve water resource monitoring, including groundwater and precipitation; b) improve water distribution to increase access to clean water and reduce loss; c) increase water storage capacity to mitigate the effects of drought conditions; d) expand or initiate water metering and charging to encourage water conservation; and e) consider the implementation of desalination using renewable power sources to assist with periods of water shortages.

Recommendation: Adaptation to future SLR will require revisions to development plans and major investment decisions, based on impacts of climate change and SLR on coastal areas and vulnerability assessments. Caribbean and Pacific island countries need to develop a comprehensive understanding of their long term risk to SLR to negotiate appropriate adaptation assistance. Future studies using high resolution Digital Elevation Models that account for erosion and not just inundation are essential to understand the true threat SLR poses to the people and economies of Caribbean and Pacific island countries and addressing this crucial knowledge gap should be a priority for Development Agencies.

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