

Impacts and Options for Adaptation – (how) can society and nature adjust?

- validating the Paris agreement -

Hans-O. Pörtner

Co-chair IPCC WGII: Impacts, adaptation and vulnerability

Paris Agreement: “aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty”... “pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels”... “increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience”.

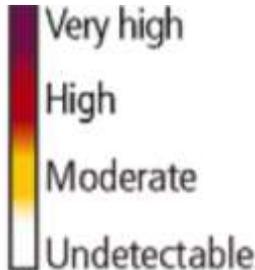
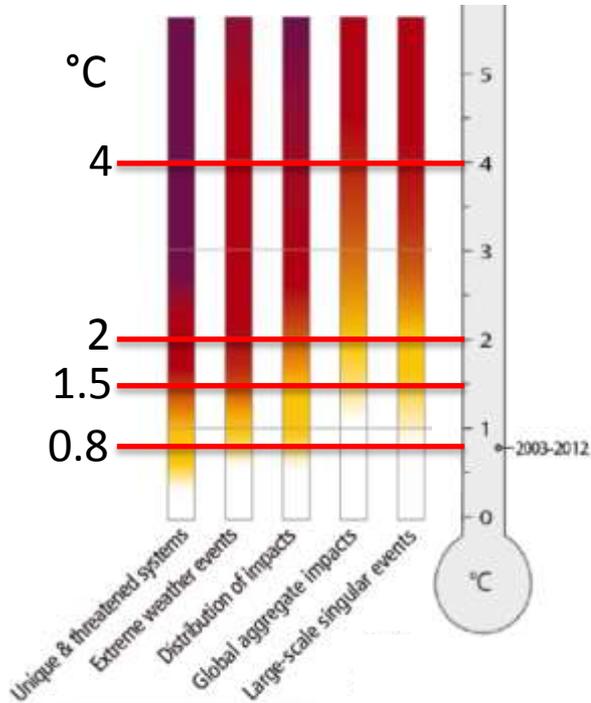
IPCC Working Group II

Taking the Paris agreement seriously:

- **Identifying impacts** (observed and projected) in relation to the degree of climate change
- **Defining the „brickwall“**: when dangerous climate change begins and which climates to avoid

- **Identifying adaptation options and capacity and the limits to acclimation and adaptation**
- **Setting the Long Term Global Climate Goal: guiding ambition in mitigation**

LTGG Risk assessment IPCC WGII: How to widely compare climate impacts?



Level of additional risk due to climate change

A role for natural and human systems and their interdependencies

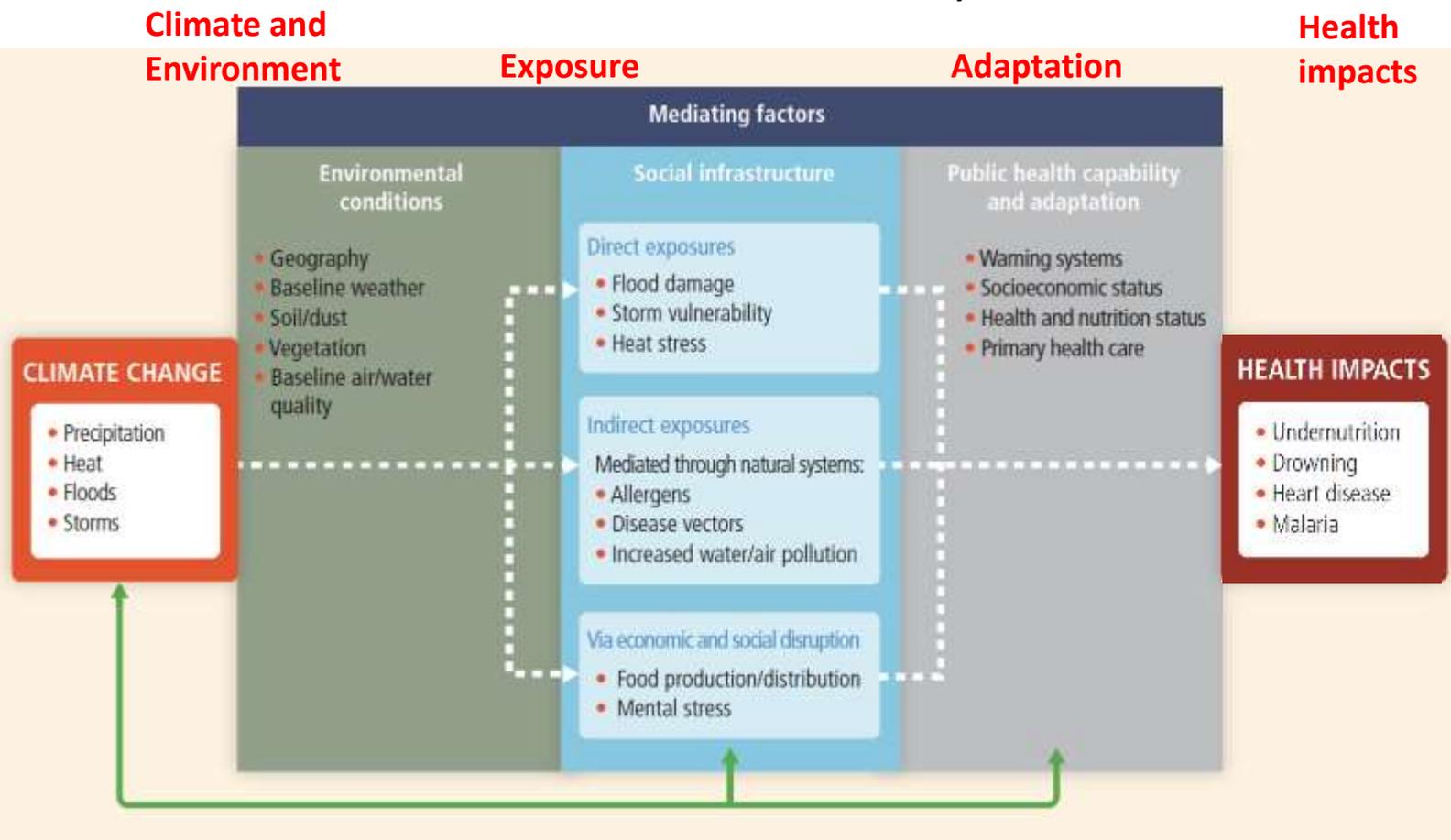
.....to guide and validate the setting of long-term global goals (LTGG, relative to preindustrial), considering levels of risk

- LTGG
- 4°C
 - 2°C
 - 1.5°C
 - 0.8°C

...comparing LTGGs, identifying... Key risks of impacts
 Risks to be avoided

Climate-related health risks already exist

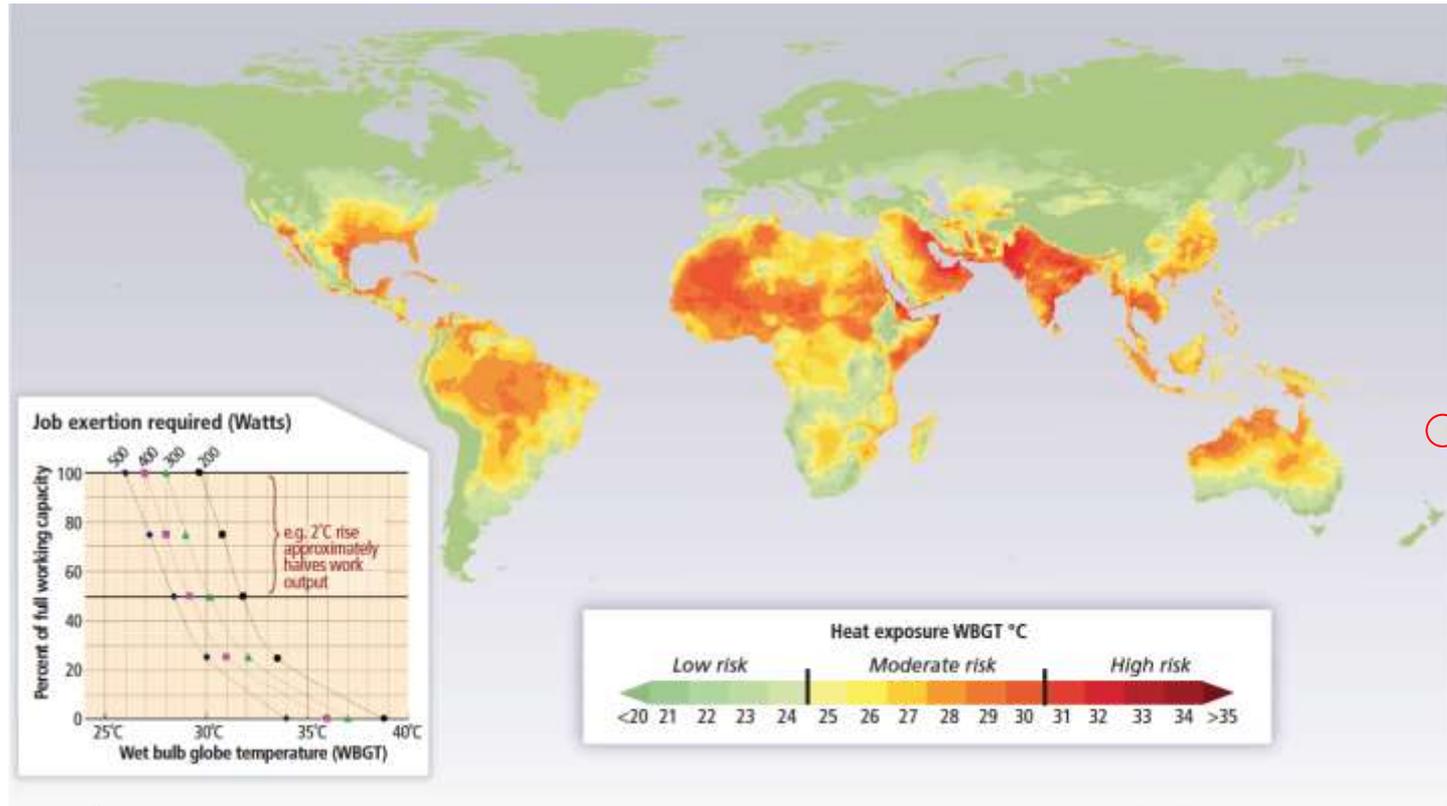
+0.8°C



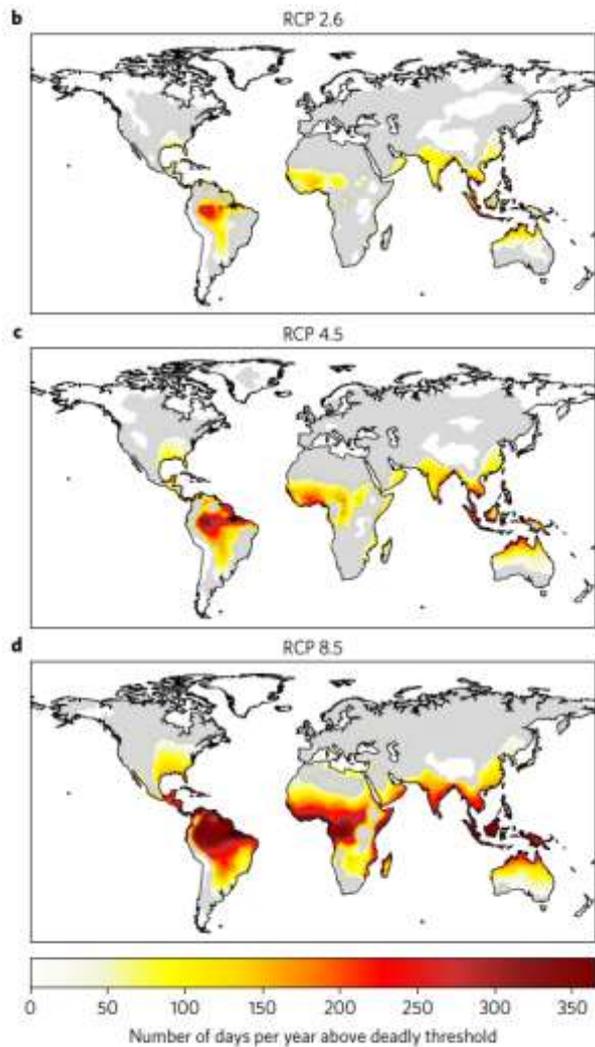
IPCC AR5 WGII Fig. 11-1

Heat limits to outdoor work capacity exceeded during summer months (1980 -2009)
further expansion projected (low adaptation capacity in human physiology)

+0.8°C



For every 1°C that ambient Tmax goes up, the Wet Bulb Globe T goes up by about 0.9°C,
Fatigue reached at core body temperature close to 40°C



Depending on the degree of climate change conditions in some parts of the planet may become intolerable outside for humans and other mammals (e.g. livestock)

exposure aggravated by an ageing population (higher vulnerability) and increasing urbanization (heat-island effects).

Mora et al., NCC 2017

TO BE ASSESSED IN AR6

...warming, water shortage

Food security constrained on landCrops

>1.5°C: high risk of more severe impacts after 2050

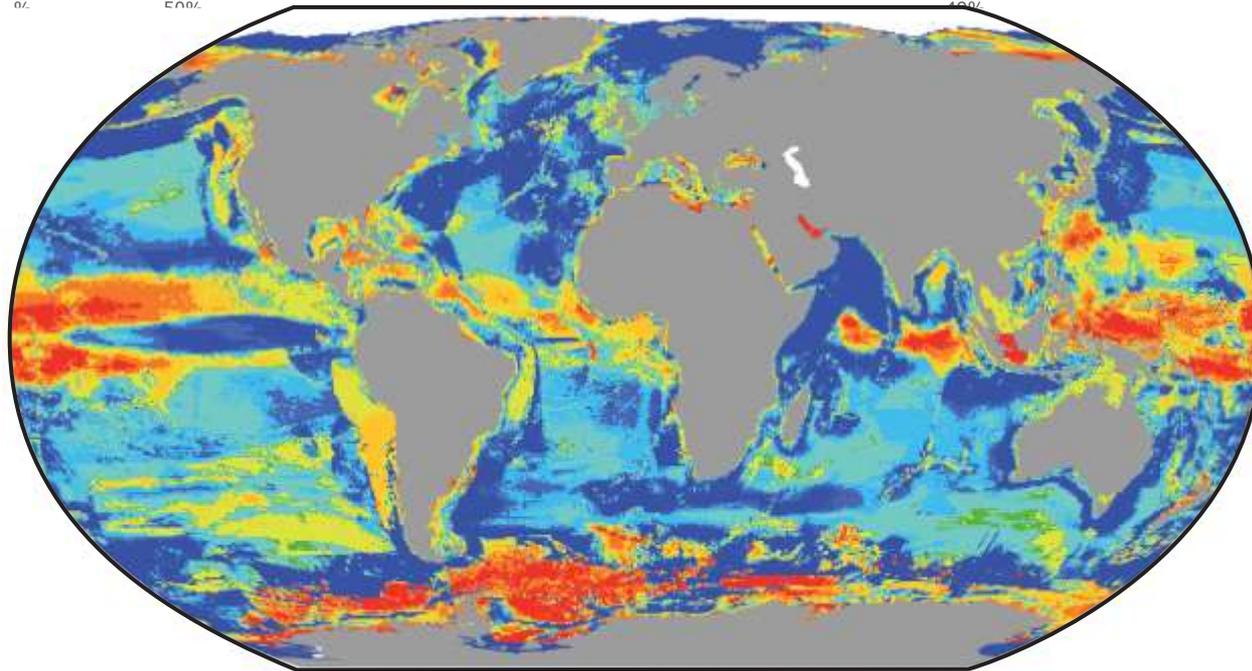
Key risk	Adaptation issues & prospects
<p>Reductions in mean crop yields because of climate change and increases in yield variability. <i>(high confidence)</i></p> <p>[7.2, 7.3, 7.4, 7.5, Box 7-1]</p>	<p>With or without adaptation, negative impacts on average yields become likely from the 2030s with median yield impacts of 0 to -2% per decade projected for the rest of the century, and after 2050 the risk of more severe impacts increases.</p> <p>...includes effects of redistributed precipitation, heat and drought events</p>

... ocean warming

+2°C

2051-60: shifted productivity, fish and invertebrate catch potential

CHANGE IN MAXIMUM CATCH POTENTIAL (2051-2060 COMPARED TO 2001-2010, SRES A1B, 2°C warming of global surface T, 0.7°C warmer Sea Surface T)



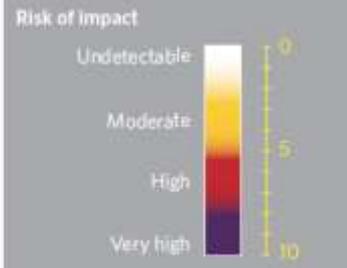
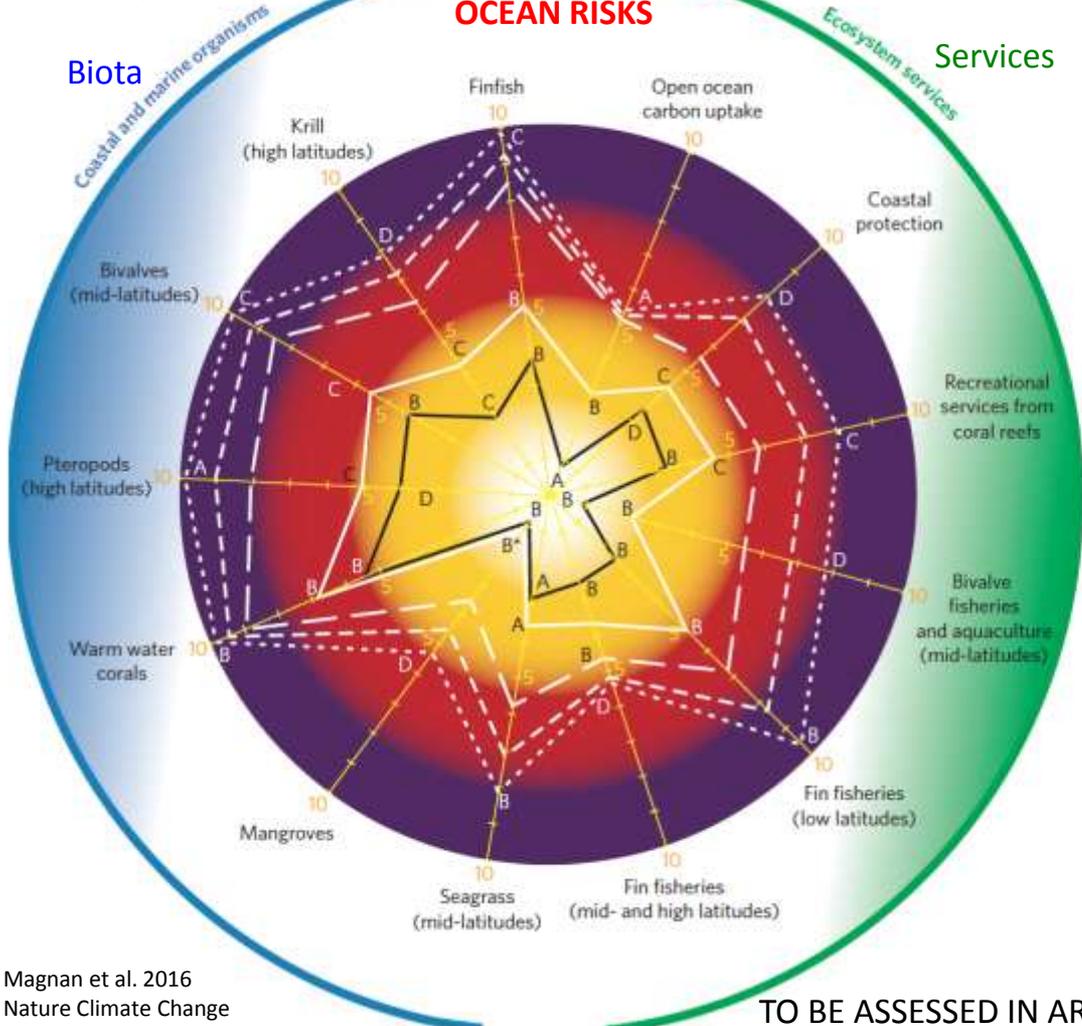
...exacerbated by ocean acidification and oxygen loss

**HIGH RISK FOR FISHERIES AT LOW LATITUDES:
small human adaptation capacity over time**

Planetary boundaries

Linking to INDCs and Global Stocktake

OCEAN RISKS



Confidence levels for the present day and the RCPs

- E Very low
- D Low
- C Medium
- B High
- A Very high

Emission scenarios:

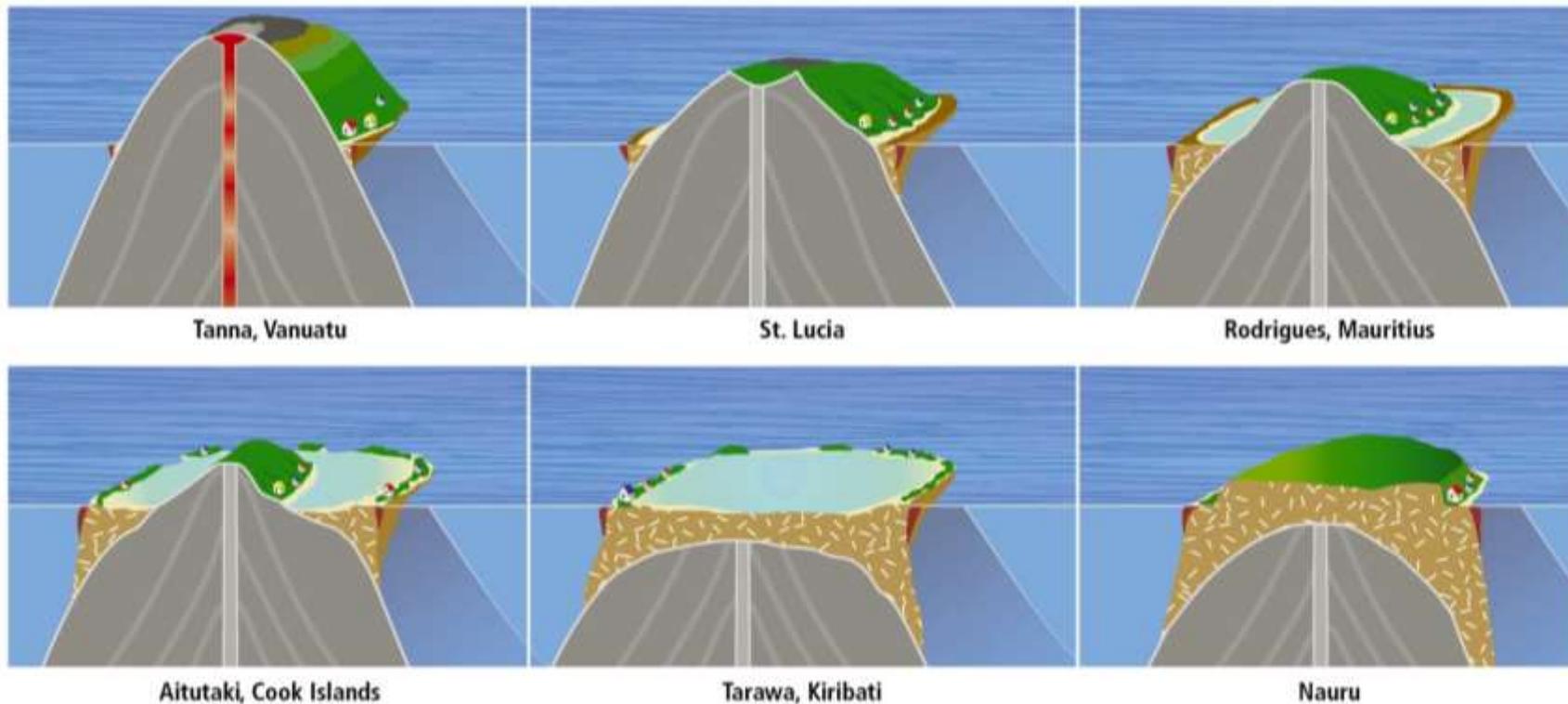
- Present day
- IPCC RCP 2.6
- Climate Action Tracker 2015 estimate (+2.7 °C)
- Climate Interactive 2015 estimate (+3.5 °C)
- IPCC RCP 8.5

Adaptation capacity of ecosystems is very limited....

....suggesting a precautionary approach in line with the Paris agreement.

°C
0.8
1.5
2.7
3.5
>4

Diversity of small islands – diversity of risk and impact levels



AR5 WGII Figure 29.1

Adaptation options

Enhance water management across sectors

- Reduce unsustainable groundwater exploitation
- Reduce water intensive crops
- Enhance irrigation efficiency
- Enhance Rainwater harvesting
- Enhance Solar driven desalination systems
- Ensure access to safe drinking water and adequate sanitation
- Establish water efficient growing of crops and vegetables
- Restore ecosystems and their services (mangroves, blue carbon)
- **Reduce likelihood of heatwaves and heat induced human failures and mortalities**
 - Reduce degree of climate change by keeping to the Paris agreement
 - Enhance cooperative and multidisciplinary international efforts



CLIMATE CHANGE

REDUCING AND MANAGING RISKS

...through adaptation
which is already occurring

...but
adaptation
capacity is
highest under
moderate
climate
change,
 $\leq 1.5^{\circ}\text{C}$

THANK YOU FOR YOUR ATTENTION!

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IPCC Secretariat: ipcc-sec@wmo.int

IPCC Press Office: ipcc-media@wmo.int

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