Asia and the Pacific in 2025 to 2050- is a sustainable future possible?

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Preview of Asia/Pacific in 2030-2050

- **Population Dynamics and Demographics**

  By 2050, regional urban population is expected to increase from 1.8 billion to over 3.3 billion

1950	1990	2010	2030	2050
0.25b	1.03b	1.85b	2.7b	3.3b

- Urbanization rates are highest in small/mediu[illegible] cities within low-income countries

Preview of the Region in 2030-2050

- **GDP and Economic Growth**
  - 2010-2030, GDP largely driven by physical capital stock boosting economic activities in emerging economies
  - developing countries, avg annual GDP growth in next 20 years ranges from 4.9% to 7% in the high-growth scenario
  - Developing countries share in world trade has roughly doubled, 14.6% in 1990 to 30.3% in 2010. In 2030, these countries will be the dominant force in global economy,

Preview of the Region in 2030-2050

- Two-thirds of world's middle class will be in Asia Pacific by 2030

- Increase in per capita disposable income is linked to increase in consumption of energy and water/waste generation

Climate change threatens development gains

Severe weather events & Aggravated resource constraints

Food Security

35%
arable Sub-Saharan land unusable in 4º world [1]

44 million
people driven into poverty from rising food prices in 2010 [4]

200 million
permanently displaced 'climate refugees' by 2050 [2]

Fragile States

Health

5 million
illnesses due to climate change in 2012[3]

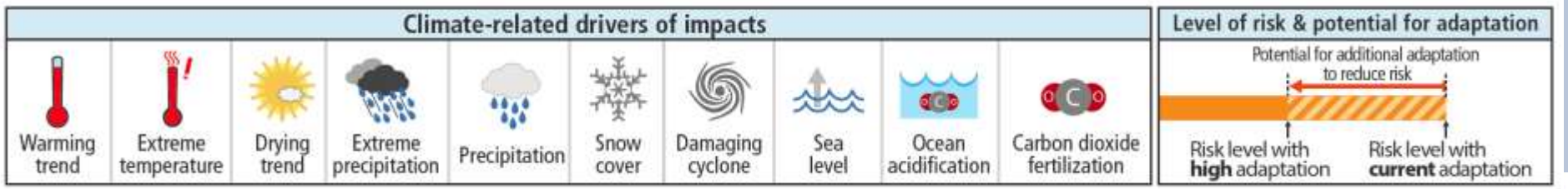
Sources:
1. The World Bank "Turn Down the Heat"
2. Columbia University CIESIN: "Environmentally Induced Population Displacements"
3. Journal Nature: "Impact of regional climate change on human health"
4. McKinsey: "Resource Revolution"
5. Bloomberg: "Thailand Says GDP May Shrink 3.7% on Floods"

147%
increase in commodity prices since 2000 [4]

4% GDP
losses in Thailand from flooding in 2011[5]

Economic Impact

Climate Change Impacts



Asia

Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation
Increased riverine, coastal, and urban flooding leading to widespread damage to infrastructure, livelihoods, and settlements in Asia (*medium confidence*) [24.4]	• Exposure reduction via structural and non-structural measures, effective land-use planning, and selective relocation • Reduction in the vulnerability of lifeline infrastructure and services (e.g., water, energy, waste management, food, biomass, mobility, local ecosystems, telecommunications) • Construction of monitoring and early warning systems; measures to identify exposed areas, assist vulnerable areas and households, and diversify livelihoods • Economic diversification		Present Near-term (2030-2040) Long-term (2080-2100) 2°C 4°C	Very low / Medium / Very high
Increased risk of heat-related mortality (*high confidence*) [24.4]	• Heat health warning systems • Urban planning to reduce heat islands; improvement of the built environment; development of sustainable cities • New work practices to avoid heat stress among outdoor workers		Present Near-term (2030-2040) Long-term (2080-2100) 2°C 4°C	Very low / Medium / Very high
Increased risk of drought-related water and food shortage causing malnutrition (*high confidence*) [24.4]	• Disaster preparedness including early-warning systems and local coping strategies • Adaptive/integrated water resource management • Water infrastructure and reservoir development • Diversification of water sources including water re-use • More efficient use of water (e.g., improved agricultural practices, irrigation management, and resilient agriculture)		Present Near-term (2030-2040) Long-term (2080-2100) 2°C 4°C	Very low / Medium / Very high

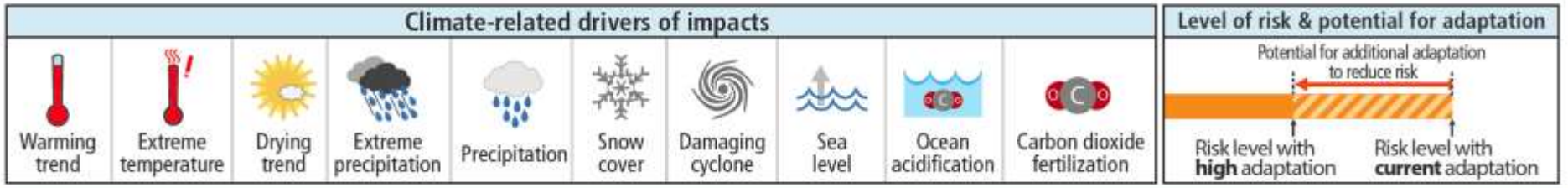
Climate Change Impacts

Climate-related drivers of impacts									
Warming trend	Extreme temperature	Drying trend	Extreme precipitation	Precipitation	Snow cover	Damaging cyclone	Sea level	Ocean acidification	Carbon dioxide fertilization

Small Islands

Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation
Loss of livelihoods, coastal settlements, infrastructure, ecosystem services, and economic stability (*high confidence*) [29.6, 29.8, Figure 29-4]	• Significant potential exists for adaptation in islands, but additional external resources and technologies will enhance response. • Maintenance and enhancement of ecosystem functions and services and of water and food security • Efficacy of traditional community coping strategies is expected to be substantially reduced in the future.		Present Near-term (2030-2040) Long-term (2080-2100) 2°C 4°C	Very low – Medium – Very high
The interaction of rising global mean sea level in the 21st century with high-water-level events will threaten low-lying coastal areas (*high confidence*) [29.4, Table 29-1; WGI AR5 13.5, Table 13.5]	• High ratio of coastal area to land mass will make adaptation a significant financial and resource challenge for islands. • Adaptation options include maintenance and restoration of coastal landforms and ecosystems, improved management of soils and freshwater resources, and appropriate building codes and settlement patterns.		Present Near-term (2030-2040) Long-term (2080-2100) 2°C 4°C	Very low – Medium – Very high

Climate Change Impacts



The Ocean

Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation
Distributional shift in fish and invertebrate species, and decrease in fisheries catch potential at low latitudes, e.g., in equatorial upwelling and coastal boundary systems and sub-tropical gyres (*high confidence*) [6.3, 30.5-6, Tables 6-6 and 30-3, Box CC-MB]	• Evolutionary adaptation potential of fish and invertebrate species to warming is limited as indicated by their changes in distribution to maintain temperatures. • Human adaptation options: Large-scale translocation of industrial fishing activities following the regional decreases (low latitude) vs. possibly transient increases (high latitude) in catch potential; Flexible management that can react to variability and change; Improvement of fish resilience to thermal stress by reducing other stressors such as pollution and eutrophication; Expansion of sustainable aquaculture and the development of alternative livelihoods in some regions.		Present Near-term (2030-2040) Long-term (2080-2100) 2°C 4°C	Very low · Medium · Very high
Reduced biodiversity, fisheries abundance, and coastal protection by coral reefs due to heat-induced mass coral bleaching and mortality increases, exacerbated by ocean acidification, e.g., in coastal boundary systems and sub-tropical gyres (*high confidence*) [5.4, 6.4, 30.3, 30.5-6, Tables 6-6 and 30-3, Box CC-CR]	• Evidence of rapid evolution by corals is very limited. Some corals may migrate to higher latitudes, but entire reef systems are not expected to be able to track the high rates of temperature shifts. • Human adaptation options are limited to reducing other stresses, mainly by enhancing water quality, and limiting pressures from tourism and fishing. These options will delay human impacts of climate change by a few decades, but their efficacy will be severely reduced as thermal stress increases.		Present Near-term (2030-2040) Long-term (2080-2100) 2°C 4°C	Very low · Medium · Very high
Coastal inundation and habitat loss due to sea-level rise, extreme events, changes in precipitation, and reduced ecological resilience, e.g., in coastal boundary systems and sub-tropical gyres (*medium* to *high confidence*) [5.5, 30.5-6, Tables 6-6 and 30-3, Box CC-CR]	• Human adaptation options are limited to reducing other stresses, mainly by reducing pollution and limiting pressures from tourism, fishing, physical destruction, and unsustainable aquaculture. • Reducing deforestation and increasing reforestation of river catchments and coastal areas to retain sediments and nutrients • Increased mangrove, coral reef, and seagrass protection, and restoration to protect numerous ecosystem goods and services such as coastal protection, tourist value, and fish habitat		Present Near-term (2030-2040) Long-term (2080-2100) 2°C 4°C	Very low · Medium · Very high

What a 4 degree world would look like and why it needs to be avoided

- Unprecedented heat waves, severe drought, major floods, sea level warming and rise; serious impacts on ecosystems and associated services
- **Impacts will be unequal-** tilted towards world's poorest regions, which have the least economic, institutional, scientific, and technical capacity to adapt
- **With current mitigation commitments and pledges ~20% likelihood we will exceed 4˚C by 2100. If pledges not met, this could happen by 2060**

Southeast Asia and Pacific in a 4 degree World

Sea level to the coastal areas of the region, with Manila, Jakarta, Bangkok, and Ho Chi Minh City all at great risk

Tropical cyclones associated extreme rainfall one third stronger than before,.

Monthly heat extremes in a 2° C hotter world that currently do not exist- projected to cover 60–70 percent of land in the northern summer, with 30–40 percent of the extremes at unprecedented levels. With a 4° C warming, today's unprecedented summer heat peak levels would be normal, affecting nearly 90 percent of the region from June to August. New heat level peaks would gain in frequency.

Annual coral reef bleaching as early as 2030 can be predicted under just a 1.5° C warming. Acidification will also threaten corals as chemical stress damages reefs.

South Asia in a 4 degree World

significant water supply crises.

annual mean monsoon levels increase by 10%, with 15% increase in variability > monsoon stronger and less predictable.

compounded risks of temperature, flooding, sea level rise, and cyclones will leave deltas and coastal urban agglomerations at risk. Bangladesh acutely vulnerable with a substantial increase in mortality.

60% increase in crop production without climate change, but 2° C rise > scenario is food imports needing to double to meet caloric needs. Decreasing food availability in 2050 is projected to cause a 35 percent increase in childhood stunting as undernourishment worsens.

> multiplier of impacts is dangerous because it is nonlinear: under a 2° C increase, 20 percent of the population is at risk from multiple stress impacts. Under a 4° C increase, it is projected to increase to 80 percent.

Resource Scarcity and Conflict

population, urbanization, economic growth, and consumption; the growing demand for food, water and energy; and intensified resource stress on biodiversity, water, and oceans, collectively point toward an ever-elevating risk—resource scarcity.

likelihood of disruptions, volatile prices, and rising political tensions

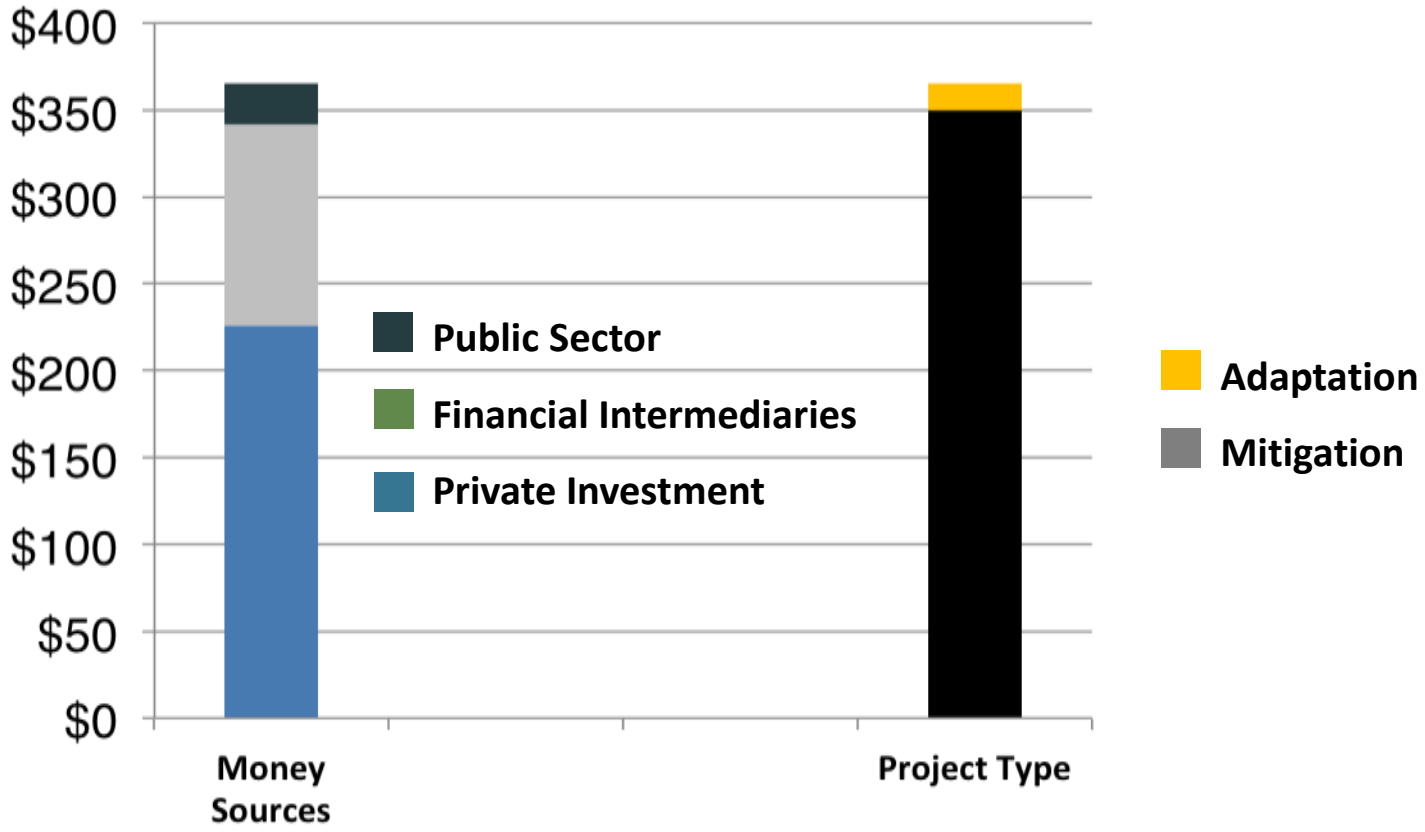
likely to affect the most vulnerable and least resilient communities and hinder efforts to reduce poverty.

conflict, migration, and trade.

What is the role of Official Development Assistance (ODA) today

- Impact of "climate finance" on multilateral and bilateral development finance is not yet clear, but likely to be substantial
- Donor community is rapidly changing (eg, China and new sources of financing)
- **Need for improved international financing directed to address international public goods is increasing as the impacts of climate change, fuel crisis, food crisis, conflict over resource scarcity, and financial crisis are recognized as potentially reversing developmental gains**

Current Levels of Climate Finance
(in USD billions)



2012 : total $359b

Private Sector $224b; Public $135b; Adaptation $22b- 48% of government flows for adaptation

The "Financing Challenge"

- Estimated that at least $40 trillion will be needed to meet urban infrastructure needs in the next 20 years
- $350 billion/yr for climate action probably a gross underestimate – it is based on a 2 degree world at end of century –
- Green Climate Fund to save the day?
- Role of ODA- CIFs and GEF experience
- Crowding in innovative finance and private sector for low carbon green growth

Financing low carbon vs climate resilient not an either/or proposition

Agriculture and forestry unique- increase resilience and sequester carbon

Think long-term and outside the box

"Climate smart agriculture" > needs to be smarter!

"Climate smart cities" > needs to be smarter!

Strengthening the provision of public goods will require a new kind of regional and global partnership.

New partnerships for long-term, at-scale action: South-south, south-north, sovereign-nonsovereign