



# STATE OF THE TROPICS

Is life in the world's tropics improving?

Dr Mark Ziembicki  
JAMES COOK UNIVERSITY





Aristotle's Torrid Zone – uninhabitable: too hot & full of pestilence

2010: 40% of world's  
population

By 2050: >50% & 2/3  
of its children

Economy growing  
20% faster

Some of the world's  
largest megacities

Highest biological &  
cultural diversity











*"In the last 75 years,  
the New Guinea  
Highland population  
has raced through  
changes that took  
thousands of years to  
unfold in much of the  
rest of the world."*

*- Jared Diamond*





Cairns  
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in collaboration with



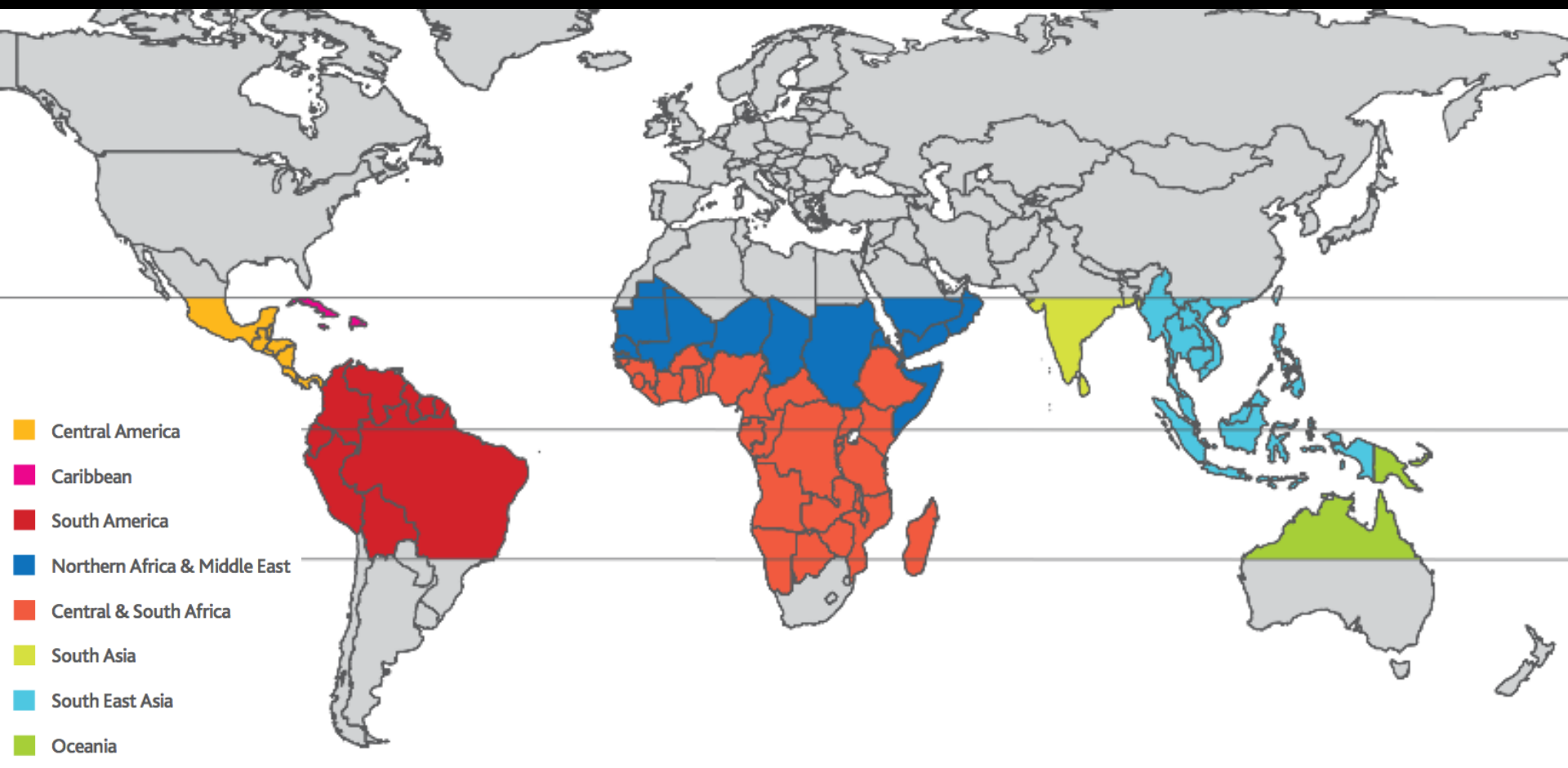


# State of the Tropics – The Report

- 50 social, economic & environmental indicators
- Data sourced from UN agencies, World Bank, IUCN, FAO, WHO...
- 8 regions in the tropics, + rest of the world







# State of the Tropics – The Report

- 50 social, economic & environmental indicators
- Data sourced from UN agencies, World Bank, IUCN, FAO, WHO...
- 8 regions in the tropics, also rest of the world
- 109 nations (8 straddling)
- Trends since 1980, +/-
- Launched in June 2014





A satellite image of the Earth's Arctic region, showing the Arctic Ocean, surrounding landmasses, and ice-covered areas. The image is used as a background for the text.

# ECOSYSTEM

## Atmosphere

- CO<sub>2</sub> & Greenhouse gas emissions
- Electricity generation
- Air pollution

## Land & Water

- Land degradation
- Agricultural land area
- Renewable water resources





# ECOSYSTEM

## Oceans

- Wild marine catch
- Aquaculture production
- Coral reefs
- Mangroves

## Biodiversity

- Threatened species
- Protected areas
- Primary forests



# HUMAN SYSTEM

## SOCIETY

- Poverty and urbanisation
  - Extreme and moderate poverty
  - Undernourished population
  - Urban population
  - Slum population
- Health
  - Life expectancy
  - Maternal & child mortality
  - Obesity & non-communicable diseases
  - HIV & AIDS
  - Tuberculosis
  - Malaria
  - Dengue & other neglected tropical diseases
- Education and work
  - Mean years of schooling
  - Youth literacy
  - Adult literacy
  - Unemployment rate





# HUMAN SYSTEM

## ECONOMY

- Economic output & the government
  - Economic output
  - Public sector debt service
- International trade & investment
  - Trade of goods & services
  - Foreign direct investment
- Science & technology
  - Research & development expenditure
  - Tertiary enrolments & graduates in science & engineering
  - Scientific & technical journal articles





# HUMAN SYSTEM

## GOVERNANCE

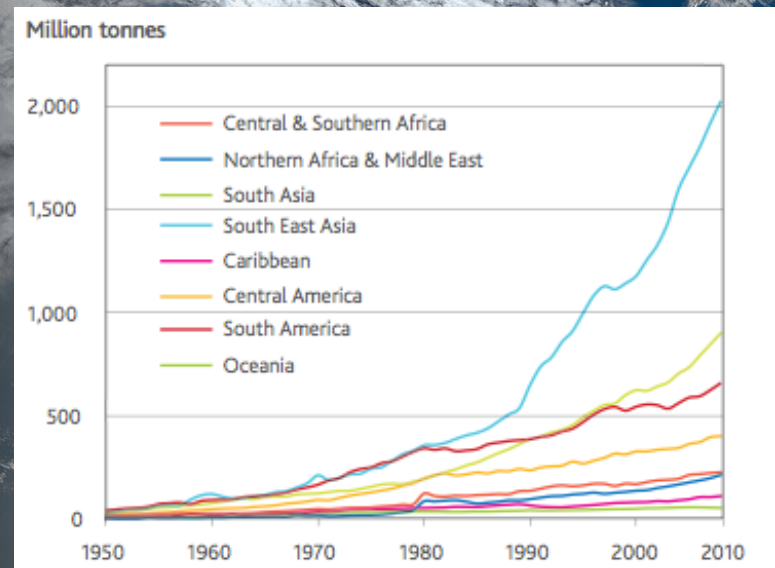
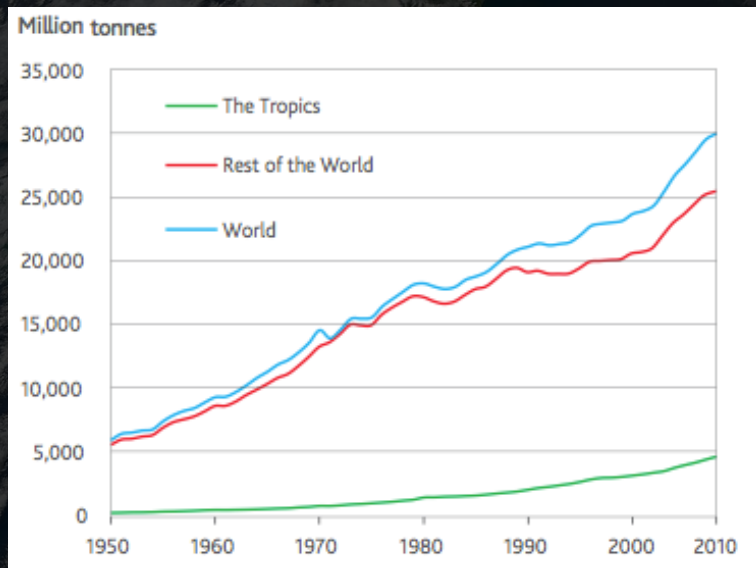
- Crime, corruption & human society
  - Refugees
  - Homicide rate
  - Corruption
- Gender equality
  - Women & education
  - Women in national parliament
- Infrastructure
  - Capital formation
  - Access to improved water sources
  - Access to improved sanitation
- Information technology & communication
  - Mobile phone subscriptions
  - Internet users



# ATMOSPHERE

# Carbon dioxide emissions

- Global anthropogenic CO<sub>2</sub> emissions increased by 400% between 1950 and 2010
- 1950: tropics accounted for 3% of emissions; In 2008 = 15% despite having 40% of world's population (5.8% pa)
- SE Asia & South Asia increasing rapidly but still relatively small c.f ROW, especially per capita



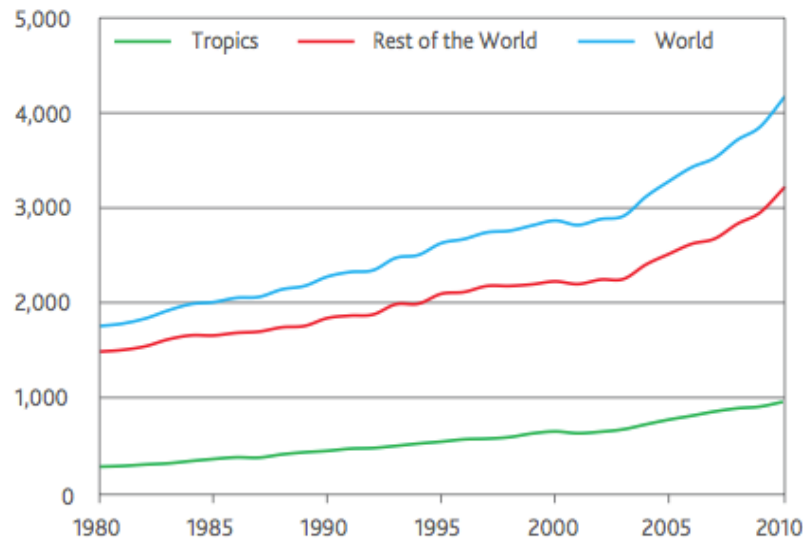


# ATMOSPHERE

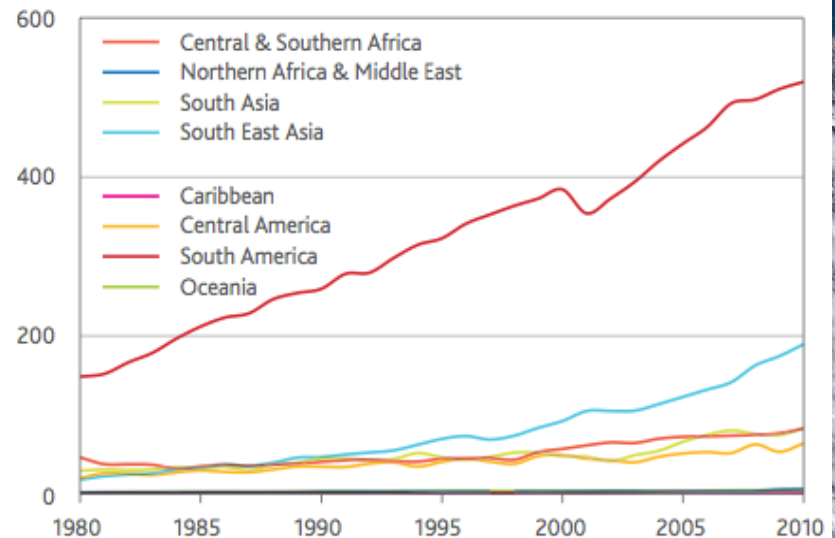
## Electricity generation (& renewables)

- Since 1980 global electricity production up by 150%. Contribution from the tropics increased from 7% to 15%
- The tropics produced 23% of global renewable energy in 2010, mostly hydroelectricity generation, also biofuels, solar & wind
- South America leading the way

Billion kilowatt hours



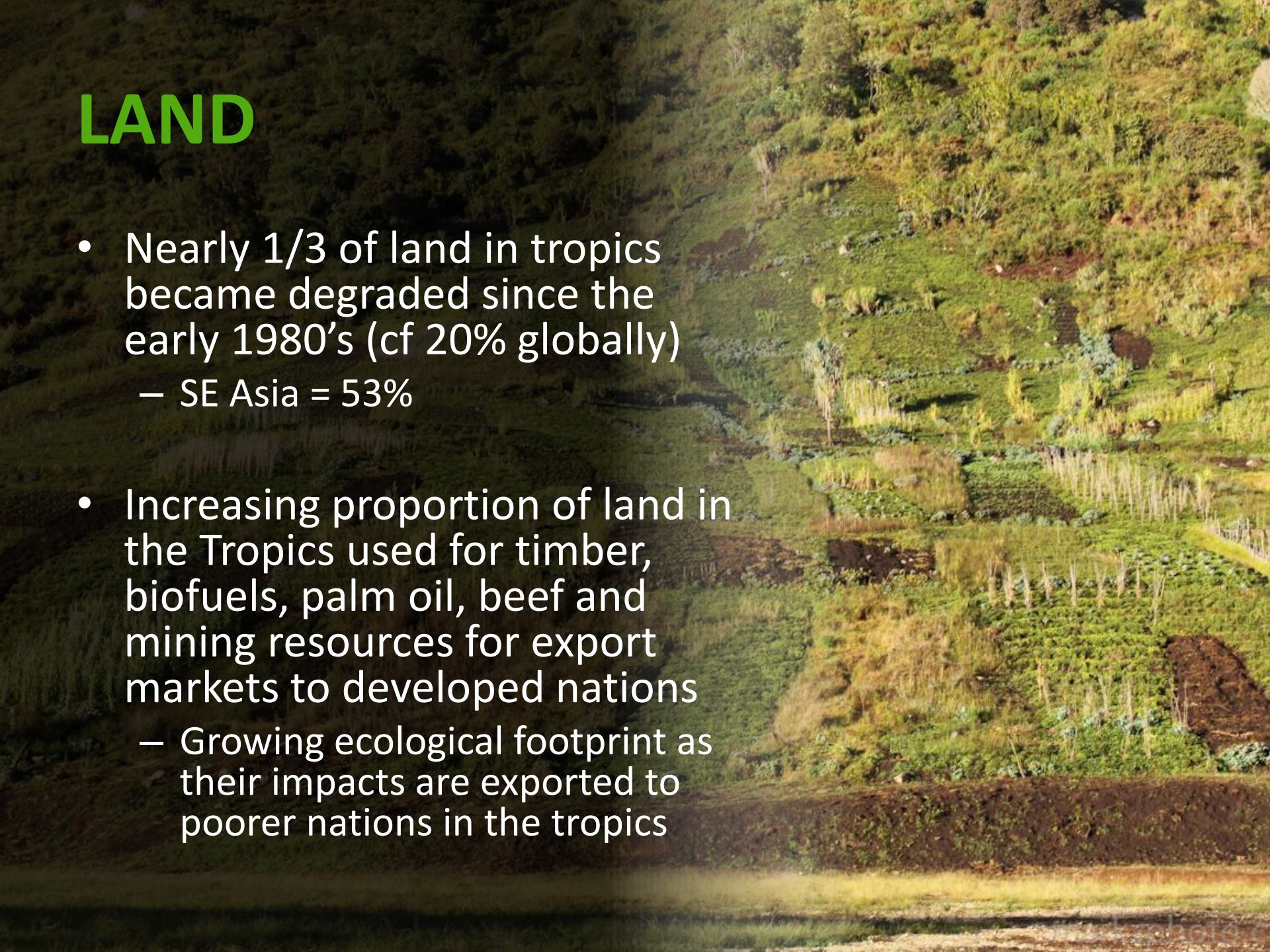
Billion kilowatt hours





# LAND

- Nearly 1/3 of land in tropics became degraded since the early 1980's (cf 20% globally)
  - SE Asia = 53%
- Increasing proportion of land in the Tropics used for timber, biofuels, palm oil, beef and mining resources for export markets to developed nations
  - Growing ecological footprint as their impacts are exported to poorer nations in the tropics

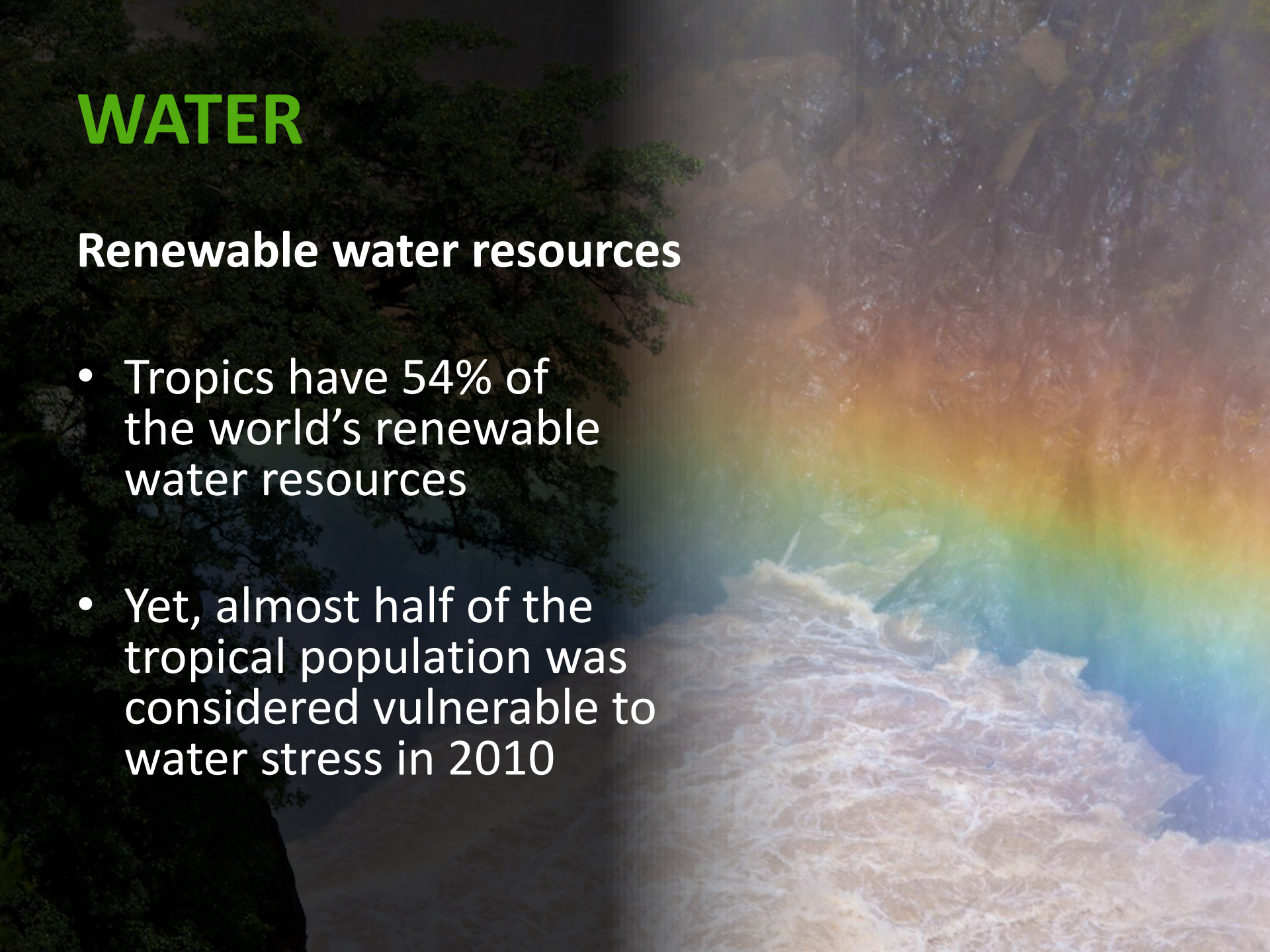




# WATER

## Renewable water resources

- Tropics have 54% of the world's renewable water resources
- Yet, almost half of the tropical population was considered vulnerable to water stress in 2010

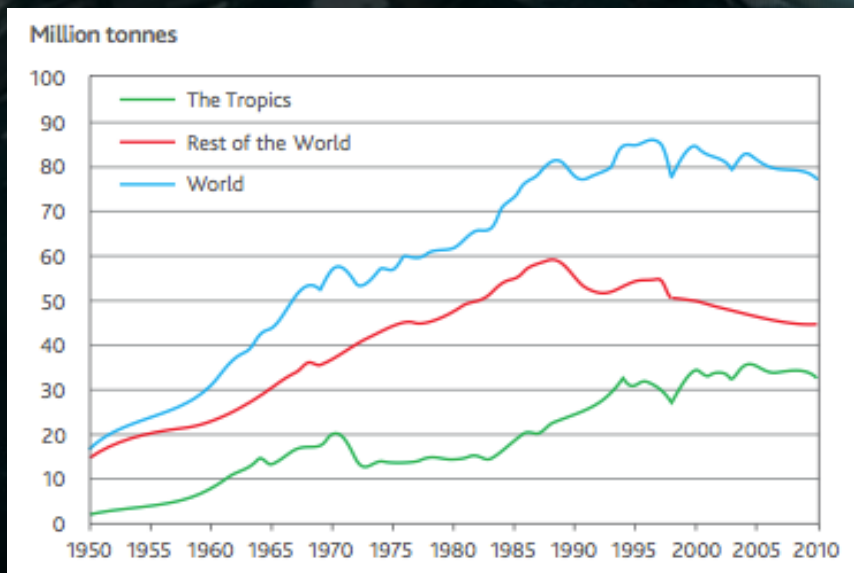




# OCEANS

## Wild marine catch

- Globally, wild marine catch grew x4's between 1950s to 1990s
  - Then declined despite increased fishing effort
- Catch increased x16's in that period in the tropics (from a lower base). Many more international ships now fishing in tropical waters

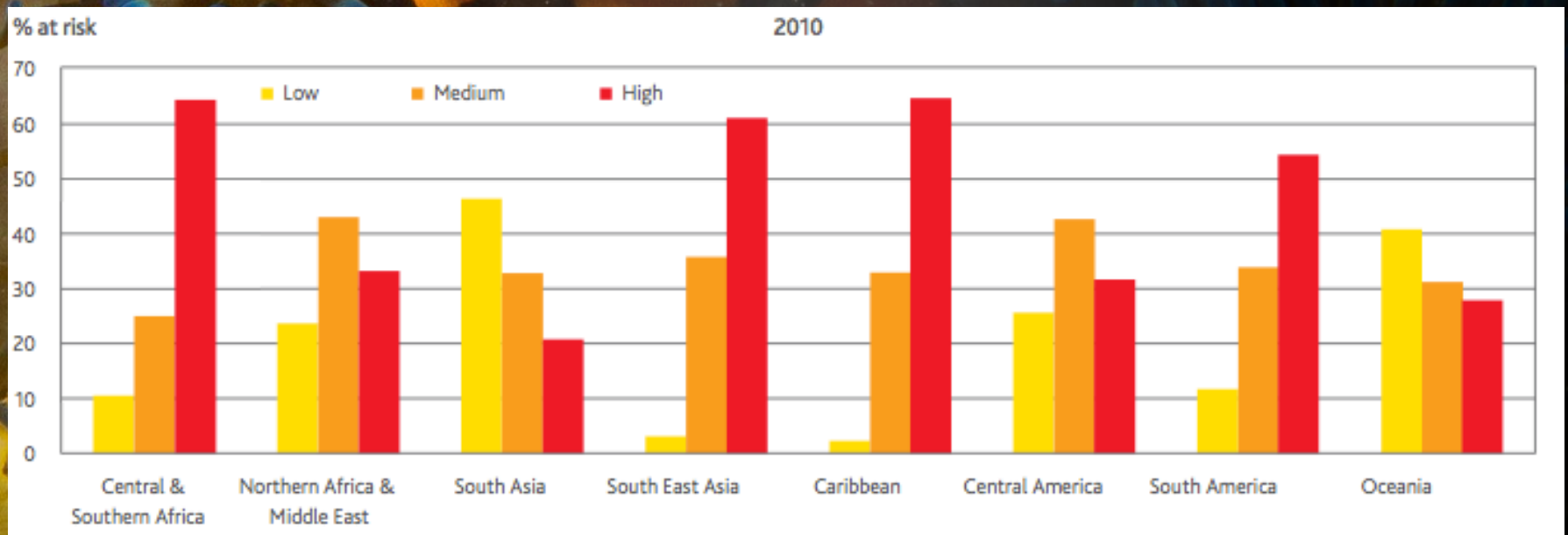




# OCEANS

## Coral reefs

- Threats to coral reef systems increased markedly between 1998 – 2010
- Half of all tropical reefs now considered to be at medium or high risk of damage





A large collage of various animals and plants, including a crocodile, a bird, a butterfly, a frog, a lizard, a turtle, a snake, a fish, a coral, a flower, a tree, and a person. The collage is arranged in a grid-like fashion, with images of different sizes and orientations. The background is a dark, textured surface. The word "BIODIVERSITY" is written in large, bold, green capital letters across the top left. Below it, the text ">80% of world's terrestrial biodiversity is in the tropics" and "99% of coral & 95% mangrove diversity" is written in white. The collage includes a variety of species, such as a crocodile, a bird, a butterfly, a frog, a lizard, a turtle, a snake, a fish, a coral, a flower, a tree, and a person.

99% of coral & 95% mangrove diversity



For all major groups assessed  
the tropics have the highest  
number & proportion of  
species under threat

Region	Amphibians		Birds		Mammals		Reptiles		Plants	
	# Assessed	Threatened %	# Assessed	Threatened %	# Assessed	Threatened %	# Assessed	Threatened %	# Assessed	Threatened %
Tropics	5,356	43	9,117	12	4,243	26	2,756	27	13,225	67
Rest of the World	1,243	25	4,398	9	2,410	15	1,418	20	3,918	42
World	6,355	41	10,050	13	5,492	25	3,744	26	15,645	60



# The other 99%

~ 60,000 species  
assessed by IUCN  
in 2012

= 4% of all  
described  
species

< 1% of species  
estimated to  
exist

We haven't yet  
found most  
species let alone  
studied or  
determined their  
conservation  
status

Not only is tropical biodiversity least known & most threatened, relative annual investment allocated to its study & protection in developing tropical countries is up to 20 times lower than in developed nations

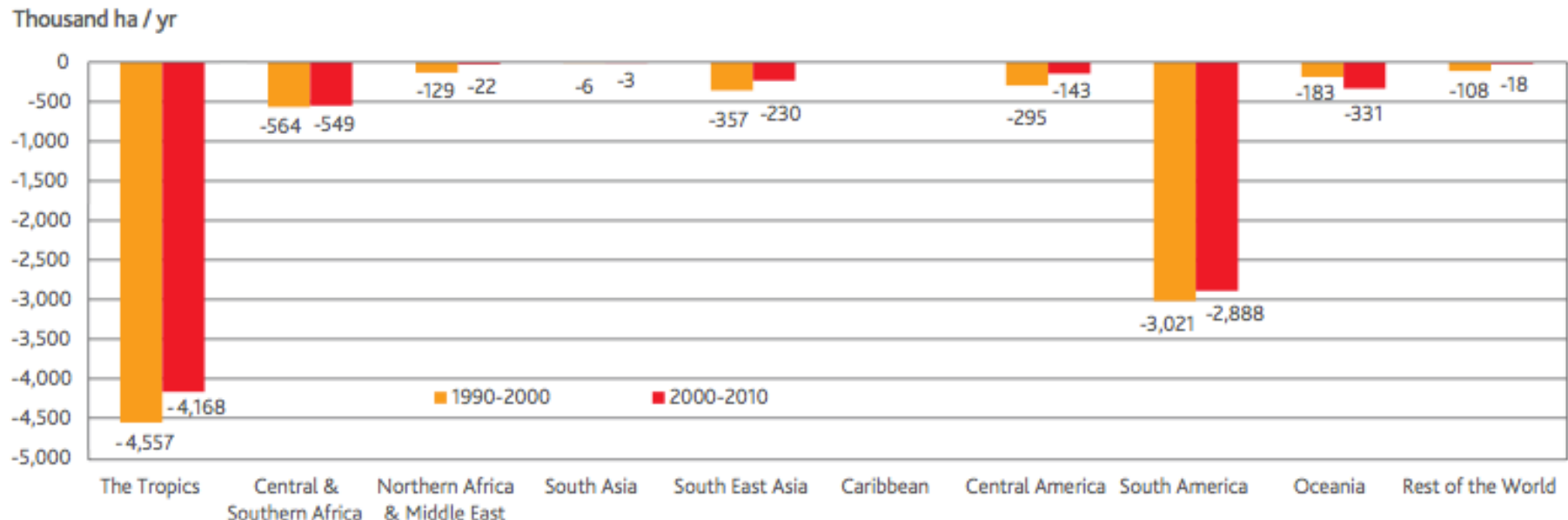




# BIODIVERSITY

## Primary forests

- Rates of deforestation in the tropics have slowed since 2000 but remain large and are ongoing

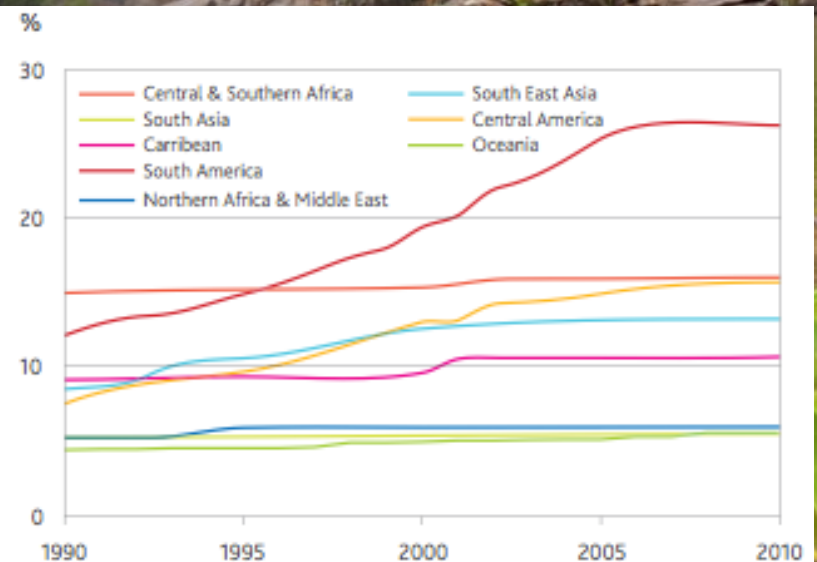
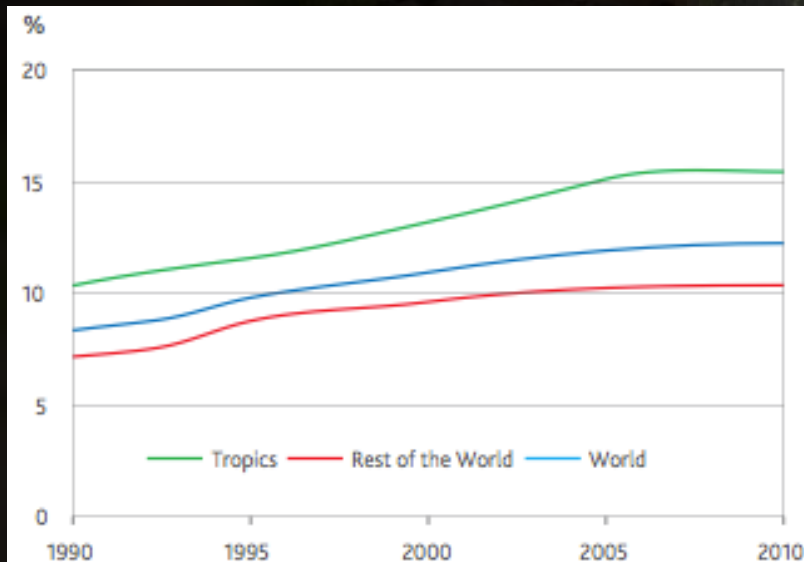




# BIODIVERSITY

## Protected areas

- Tropics have greater % of terrestrial area under protection than rest of the world
- % of marine area protected is lower although the gap is narrowing

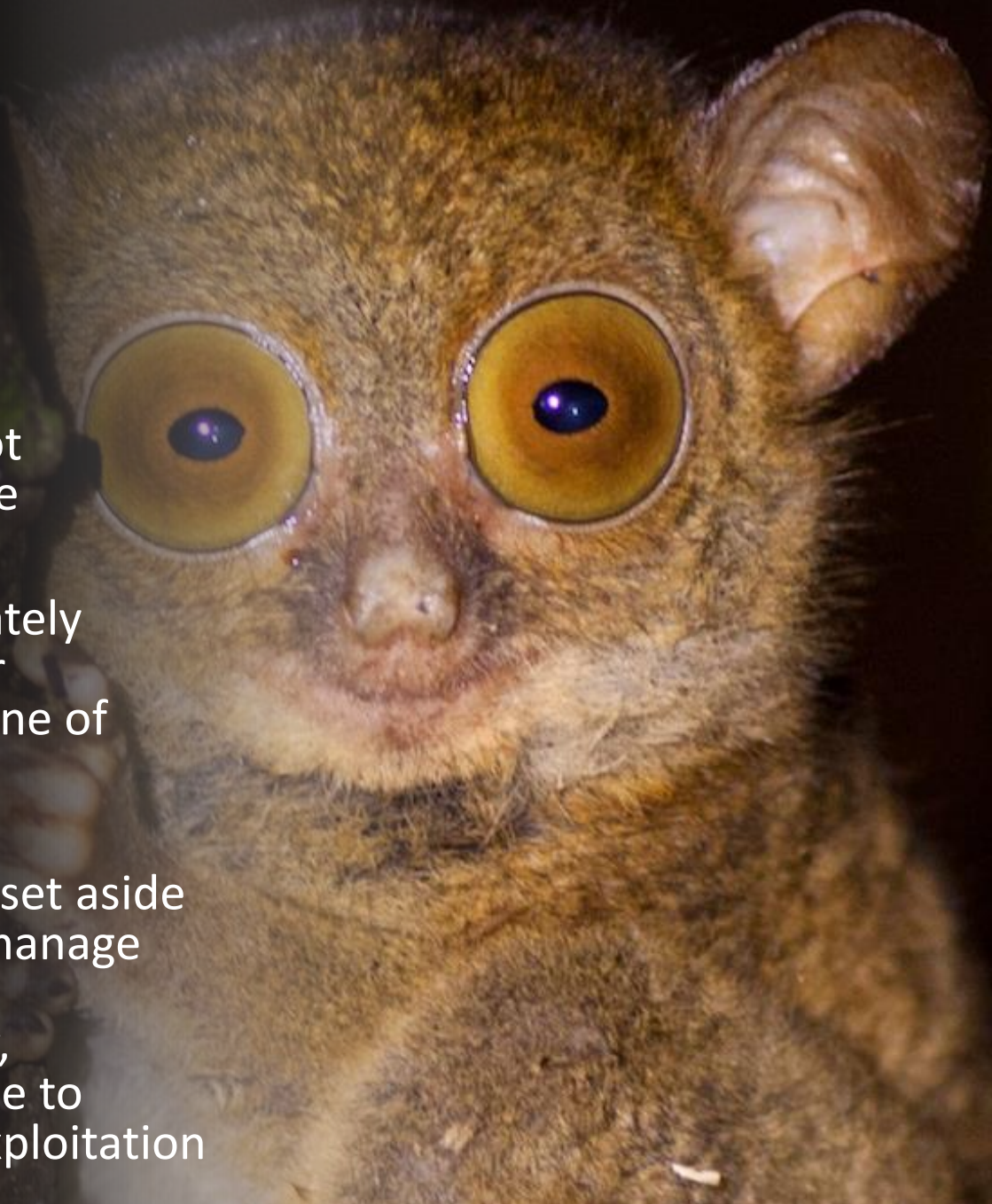




# BIODIVERSITY

## Protected areas

- Protected area system is unevenly distributed & not ecologically representative
- They don't always adequately protect biodiversity either (eg Kakadu NP & the decline of native mammals)
- Suggests need to not just set aside land but to monitor and manage protected areas far more intensively and effectively, particularly in places prone to illegal encroachment & exploitation

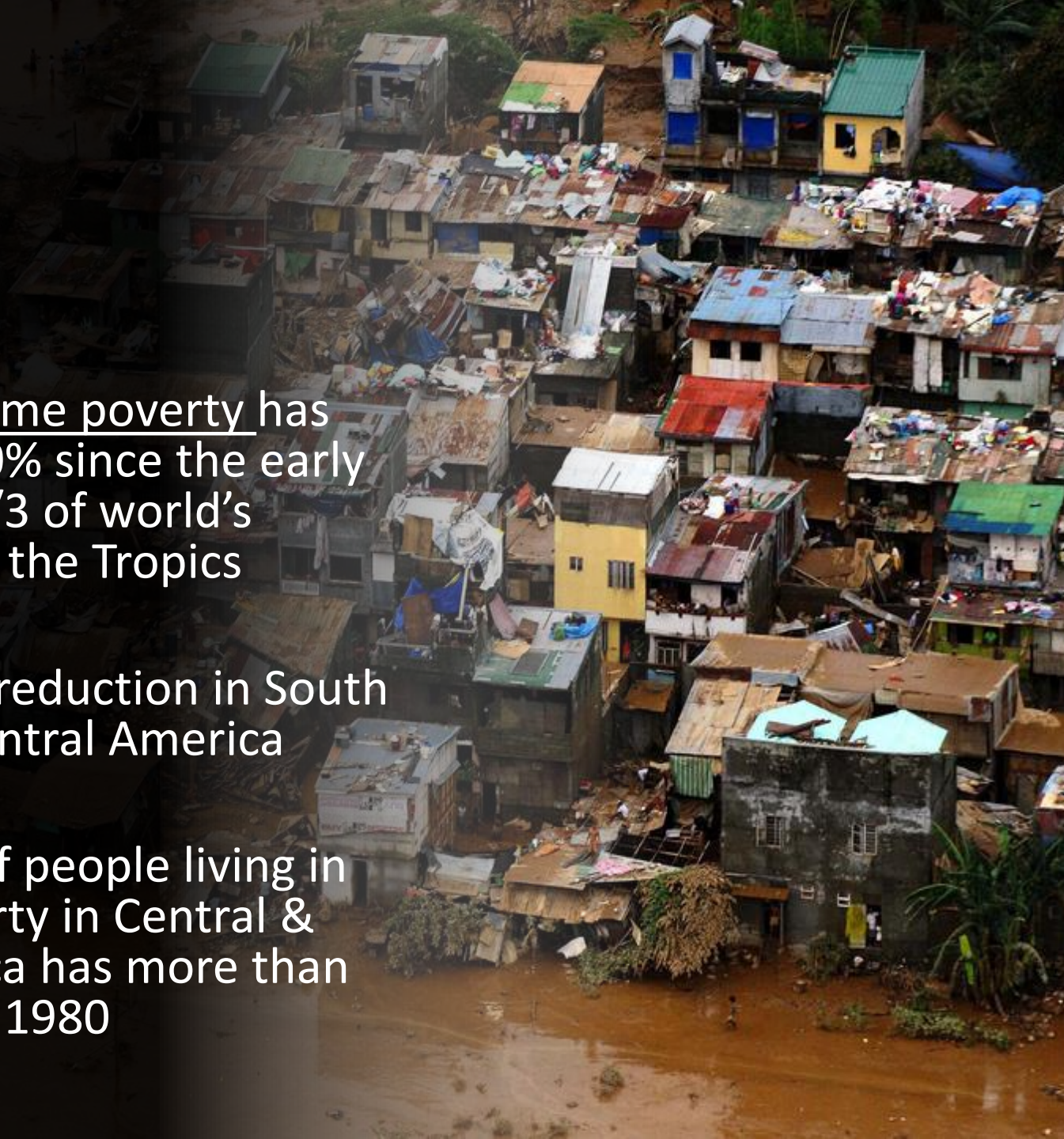




# SOCIETY

## Poverty

- Globally, extreme poverty has declined by 50% since the early 1980s, but  $>2/3$  of world's poorest live in the Tropics
- Most poverty reduction in South East Asia & Central America
- The number of people living in extreme poverty in Central & Southern Africa has more than doubled since 1980





# SOCIETY

## Health

- Life expectancy has increased across all regions of the tropics in the past 60 years, but is still well below the rest of the world
  - Gap narrowed from 12.1 years to 7.7 years in this time
- Maternal & child mortality rates: all regions in the tropics have experienced significant decreases since 1950
  - But, on a global scale the tropics accounts for the vast majority of these deaths





# ECONOMY

## Economic output

- Tropics have outperformed rest of the world in economic growth over the past 30 years. 20% faster
- Now represents 18.7% of global economic activity
- However, GDP per capita in the tropics is estimated to be only 1/3 that of the rest of the world



# GOVERNANCE

- Tropics had lower scores than rest of the world for a range of governance indicators, indicating higher rates of corruption
- Gender equality
  - % of women in different sectors of society is improving. Globally, women in national parliaments increased from 12% in 1997 to 20% in 2011
  - Rwanda @ 56%!





# So... Is life in the tropics getting better?

- Across a range of indicators ...mostly ...at least for one species
- But significant regional variation & major challenges exist
- Not so great on environmental indicators





# Climate change & population: the tropics are particularly vulnerable

Forget about  
polar bears!...

Tropical  
biodiversity is  
much more  
vulnerable to  
climate change  
impacts

Small  
geographic  
ranges

Naturally  
rare



Specialised  
to a narrow  
set of  
conditions

White lemuroid possum

(Mike Trennery)



# Climate change in the tropics

The tropics will see the emergence of novel climatic conditions

Changes in temperature and precipitation beyond past variability, leading to novel climates with no current analogues on the planet

Singapore predicted to be hottest major city





# Climate change in the tropics

Some of the most vulnerable communities least able to implement effective response strategies

- Food and water security
- Limited or poor infrastructure
- Natural disasters
- Many small developing island states
- Tropical health: unique diseases, parasites

TROPICS ARE EXPANDING





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Sandra Harding, Rodney McComiskie, Mark Wolff,  
Dennis Trewin, Stephanie Hunter

### Contributing authors:

Alexandra Edelman, Andrea Gedling, Elena Konovalov, Rodney  
McComiskie, Ann Penny, Nicholas Roberts, Shelley Templeman,  
Dennis Trewin, Blair Trewin, Richard Corlett, Janet Hemingway,  
Joanne Isaac, Steve Turton, Mark Ziembicki

### Advisors & reviewers:

Norm Duke, Dean Jerry, Natkunam Ketheesan, William Laurance,  
Ali Mahdi, Linda Shields, Jeff Warner, Robert Bell, Reggie Carter,  
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