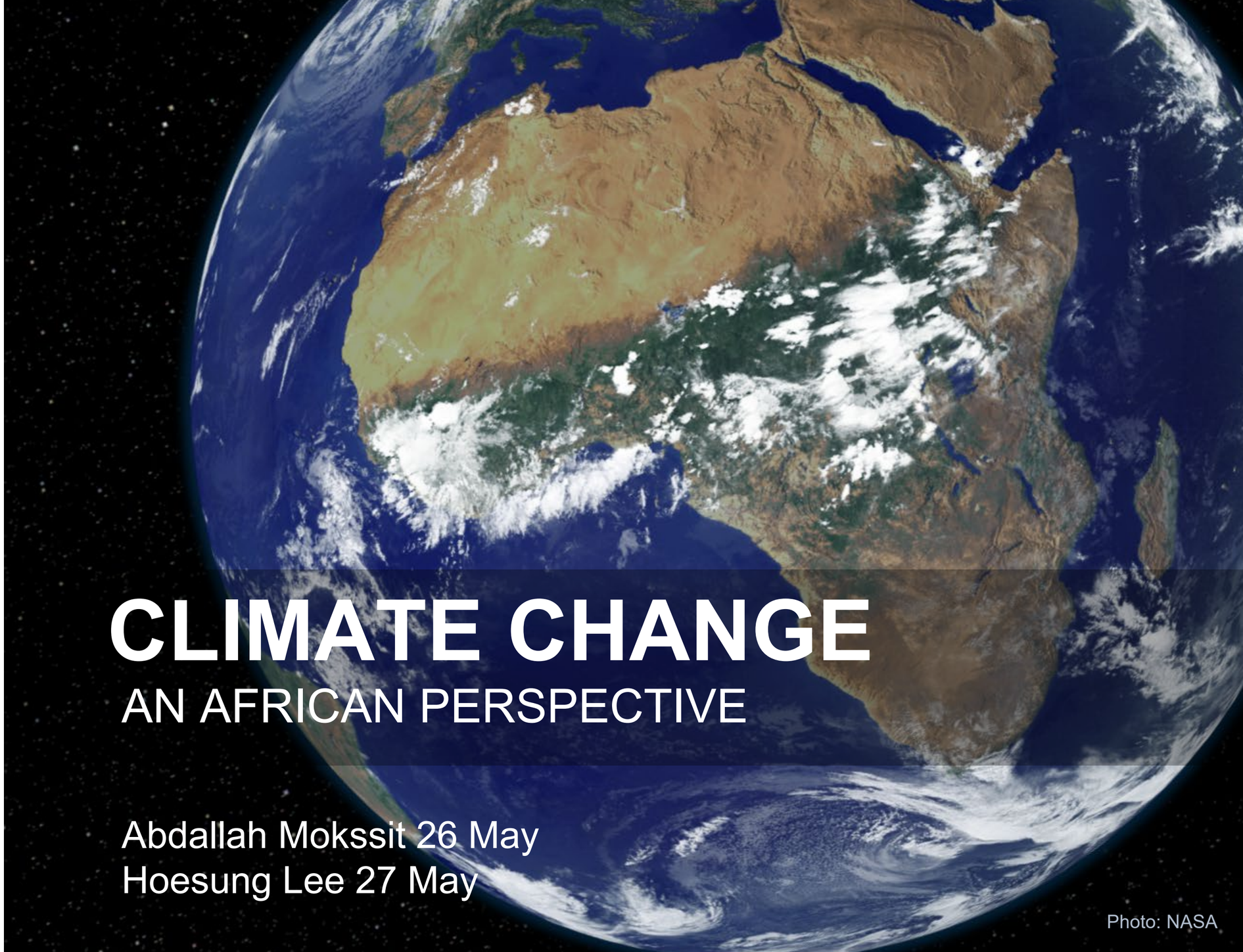
ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP



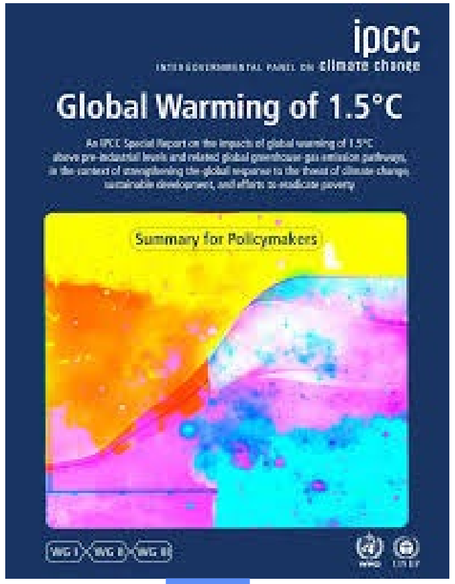
CLIMATE CHANGE

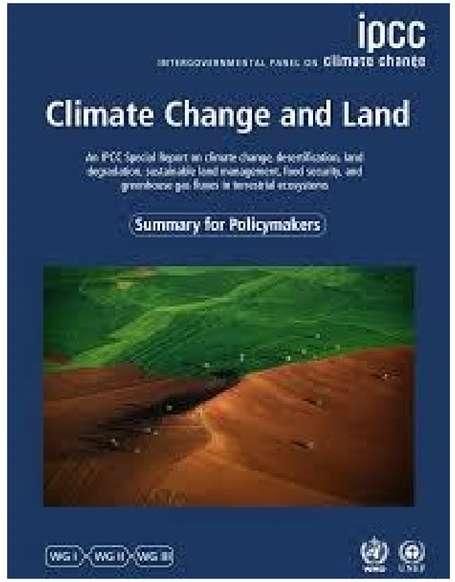
AN AFRICAN PERSPECTIVE

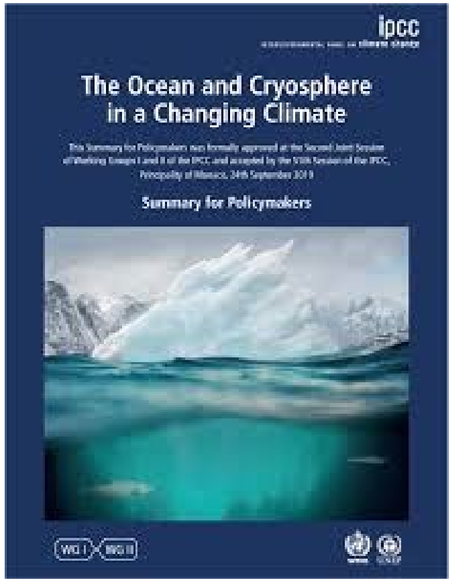
Abdallah Mokssit 26 May
Hoesung Lee 27 May

Photo: NASA

IPCC SPECIAL REPORTS 2018-2019

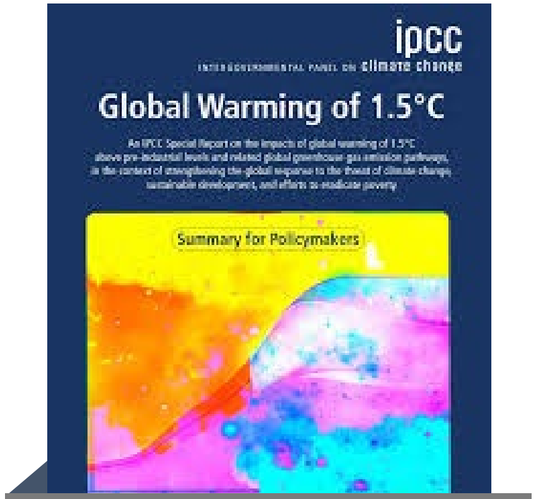




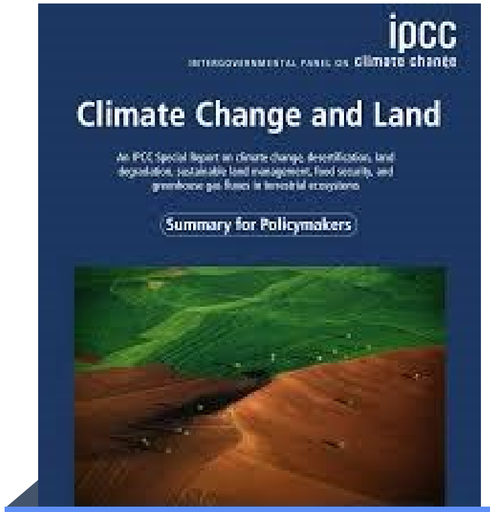


91 scientists
40 countries
6000 papers
>1000 expert reviewers
45,000 review comments

IPCC SPECIAL REPORTS 2018-2019

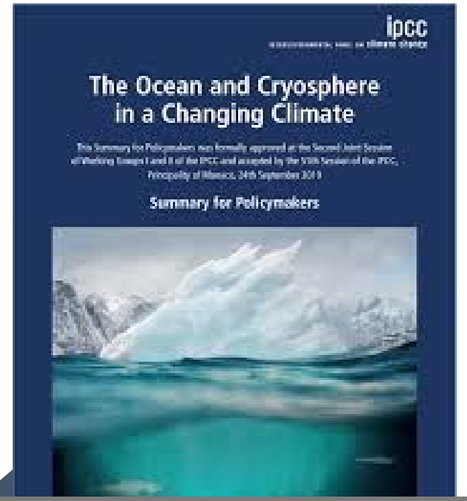


11%



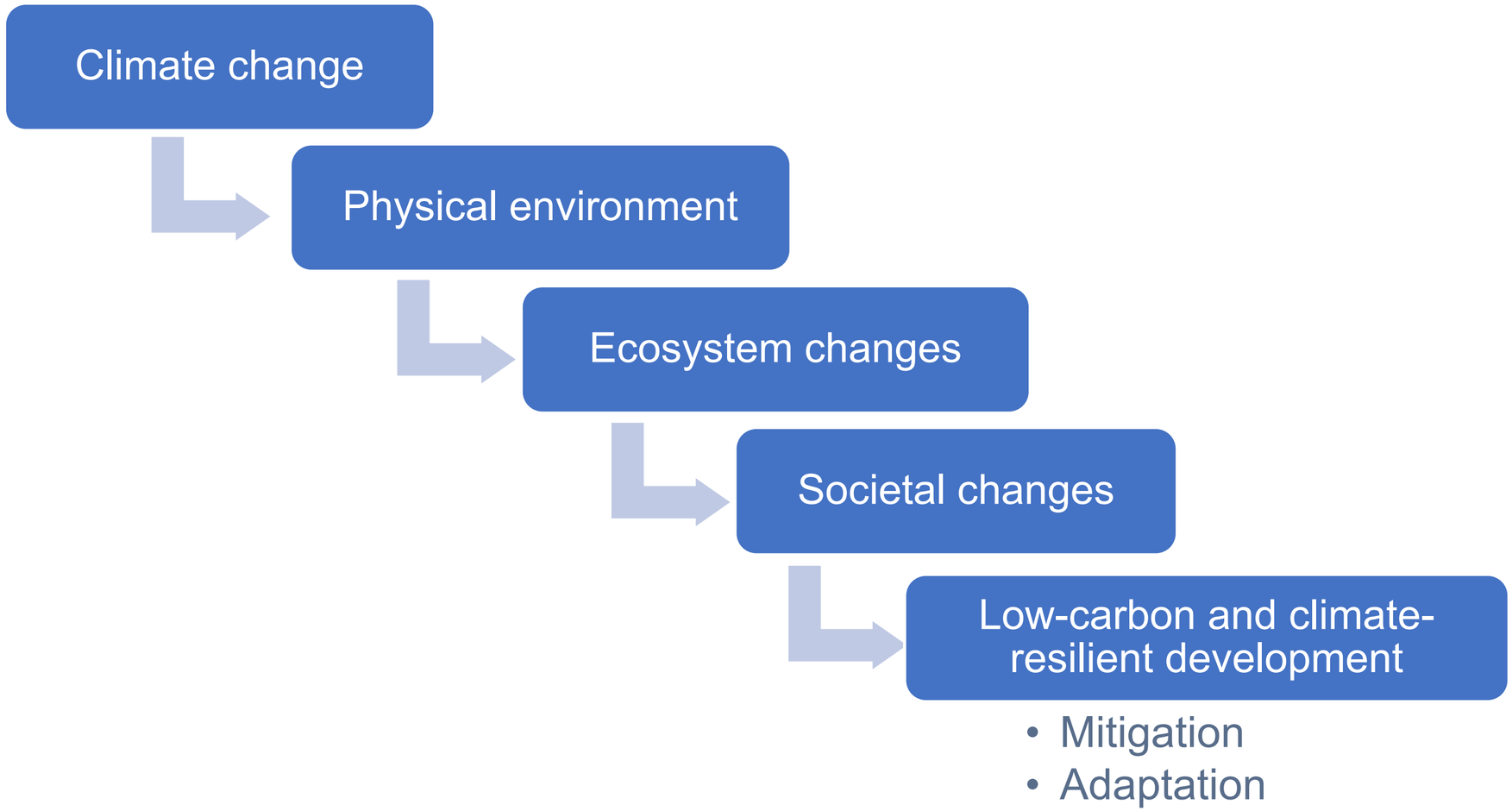
15%

AFRICAN AUTHORS

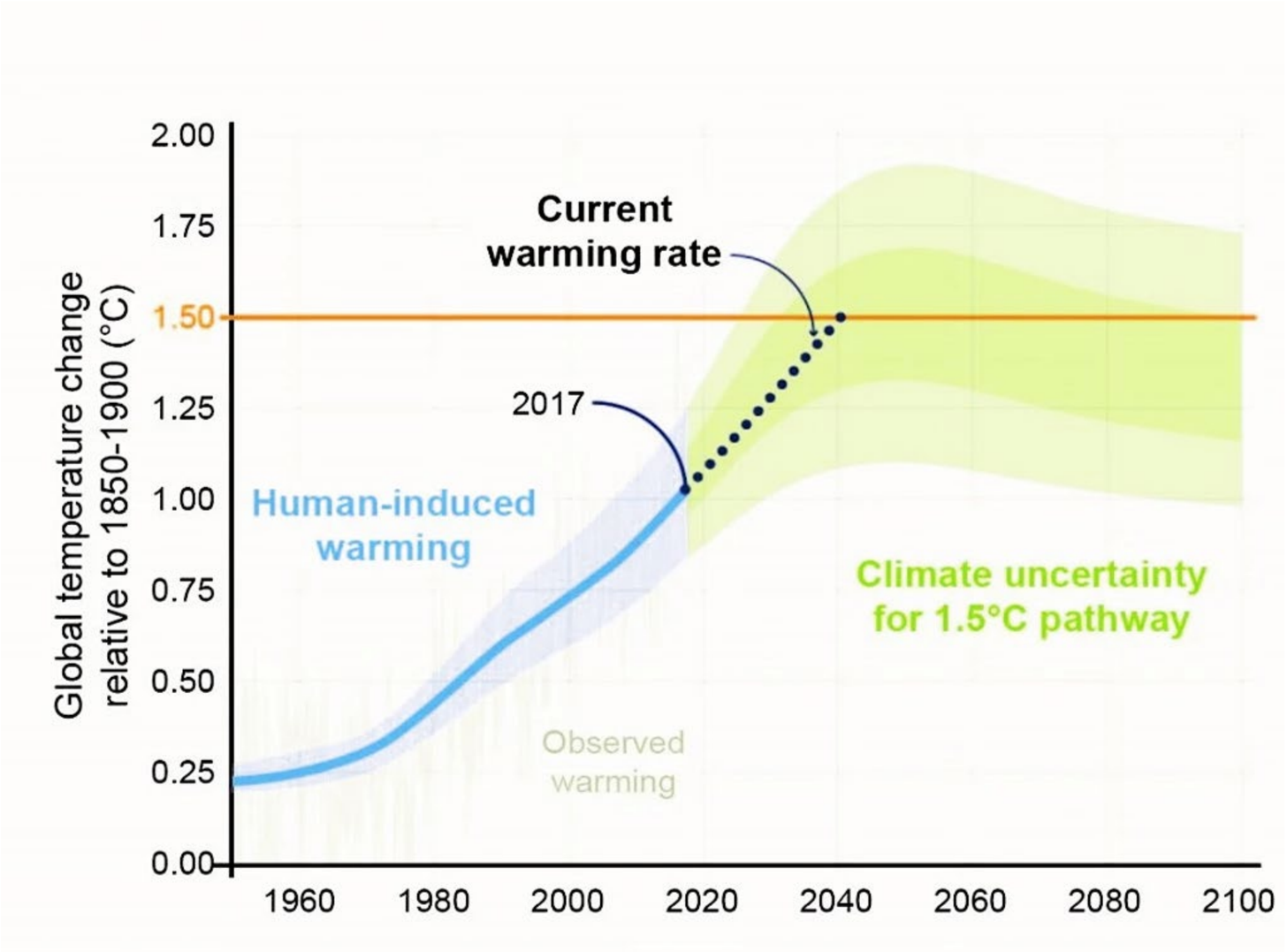


3%

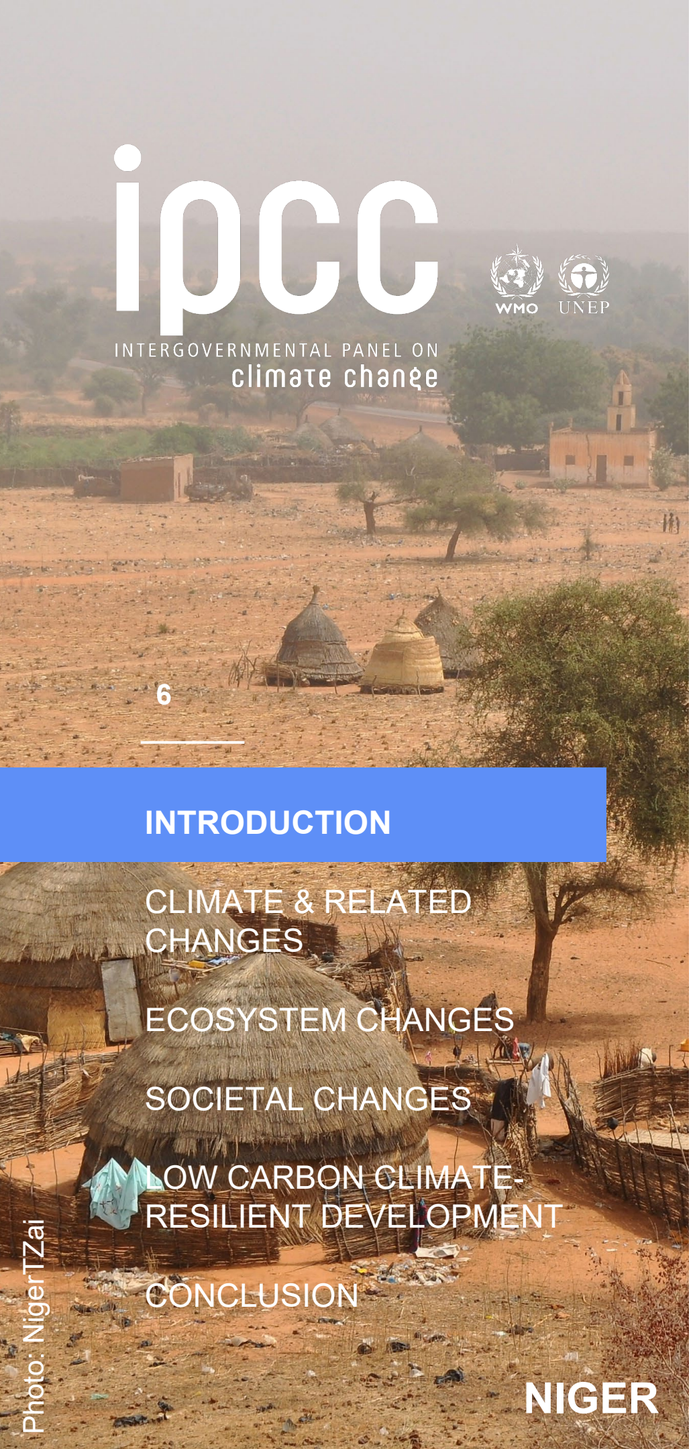
OUTLINE



WHAT DO WE KNOW?

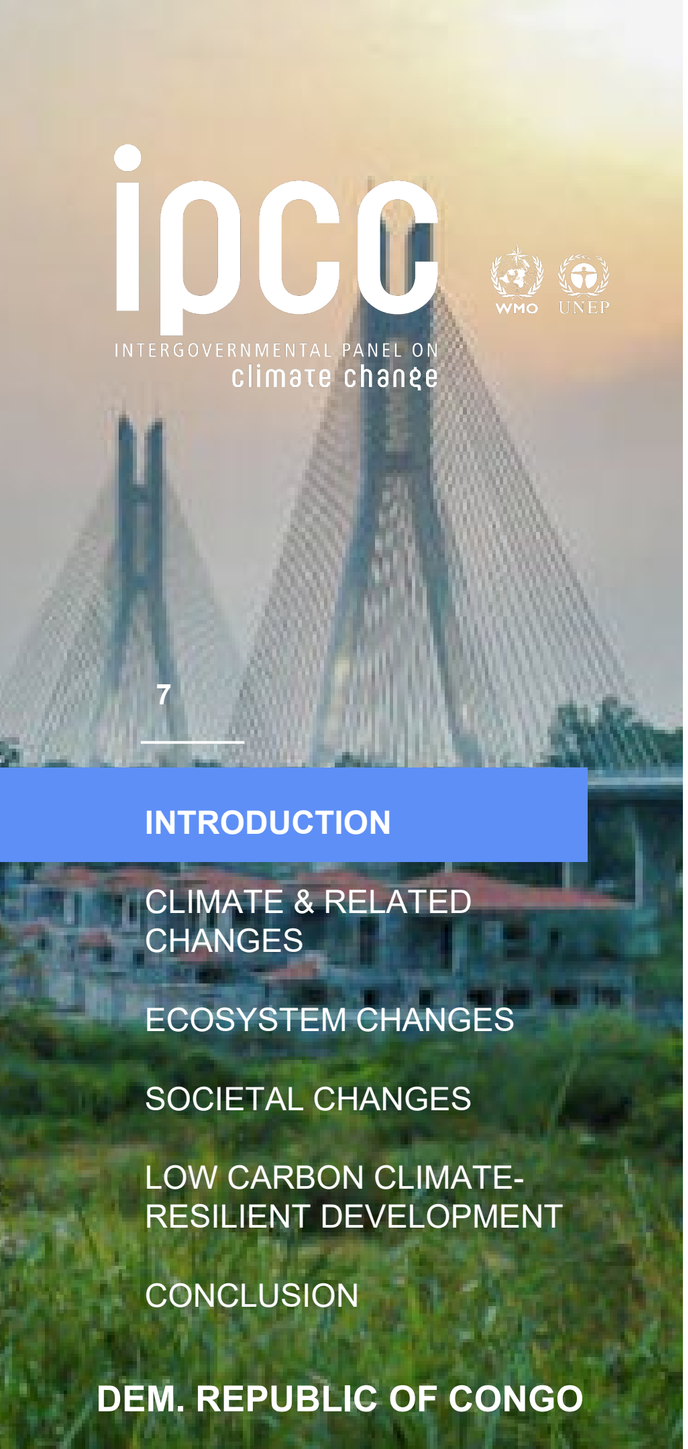


SOURCE: IPCC SR15, FAQ1.2



WHAT DO WE KNOW?

- The world has warmed by about 1°C over the past 150 years
- Paris Agreement: “well below 2°C… pursue efforts…1.5°C”
- Current pledges: 3°C of by 2100, more after that
- Climate change is affecting lives, livelihoods and nature
- Every bit of warming matters
- Every year matters
- Every choice matters
- Climate action and sustainable development
- Clear benefits to keeping warming to 1.5°C or below
- Limiting warming to 1.5°C presents a global challenge



WHAT DO WE KNOW ABOUT AFRICA?

- Parts of Africa have warmed by more than 1.5°C
- 3.8% share of global carbon dioxide emissions
- Increased exposure and vulnerability
- Other existing challenges
- Extra burden of climate change
- Fastest urbanizing continent
- Opportunity for climate-resilient, low-carbon development

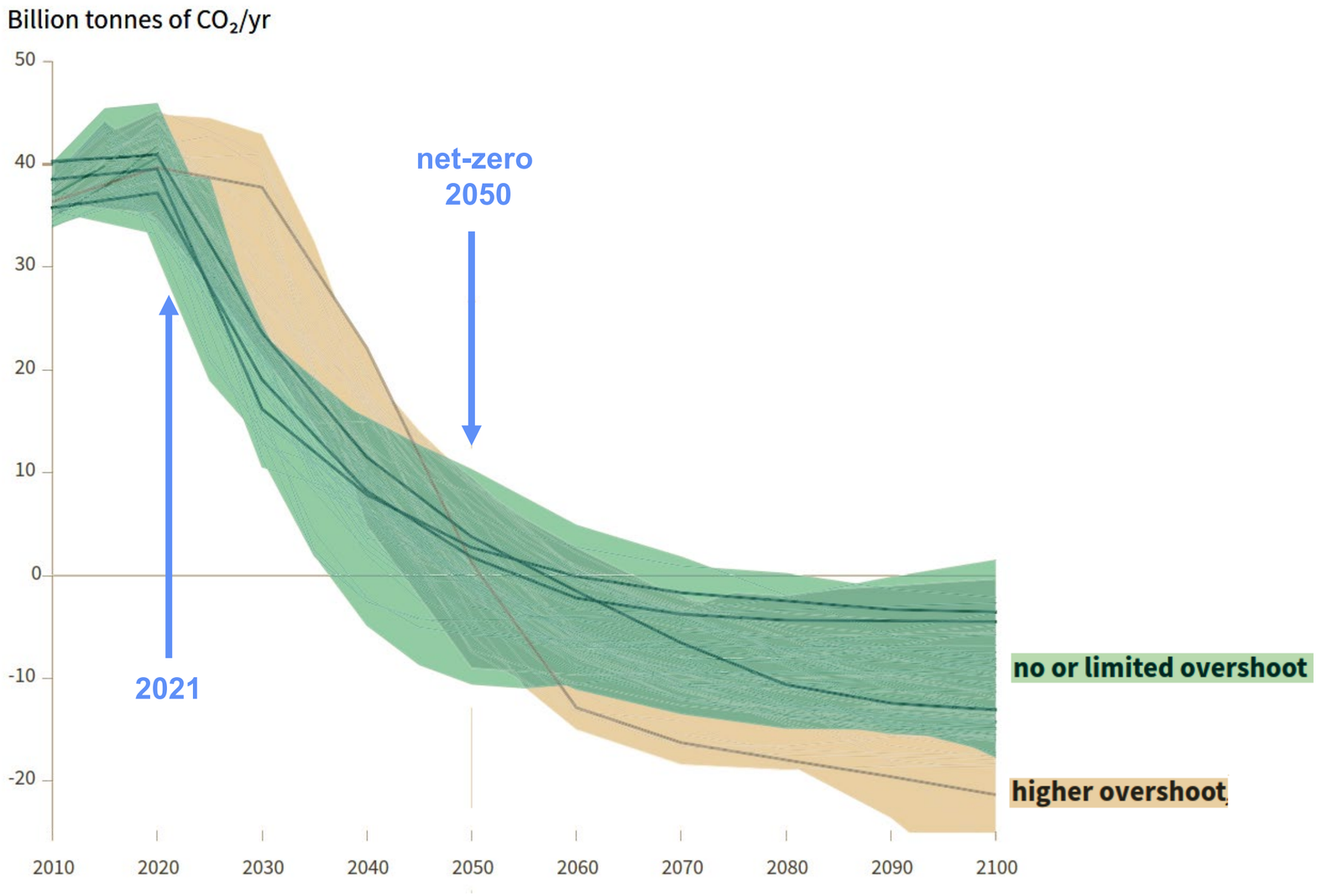
ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

"Limiting warming to 1.5°C is not impossible but, in many parts of the world, it would require **unprecedented transitions in all aspects of society** - including energy, land, urban, infrastructure & industrial systems.

JIM SKEA
CO CHAIR
IPCC WORKING GROUP III

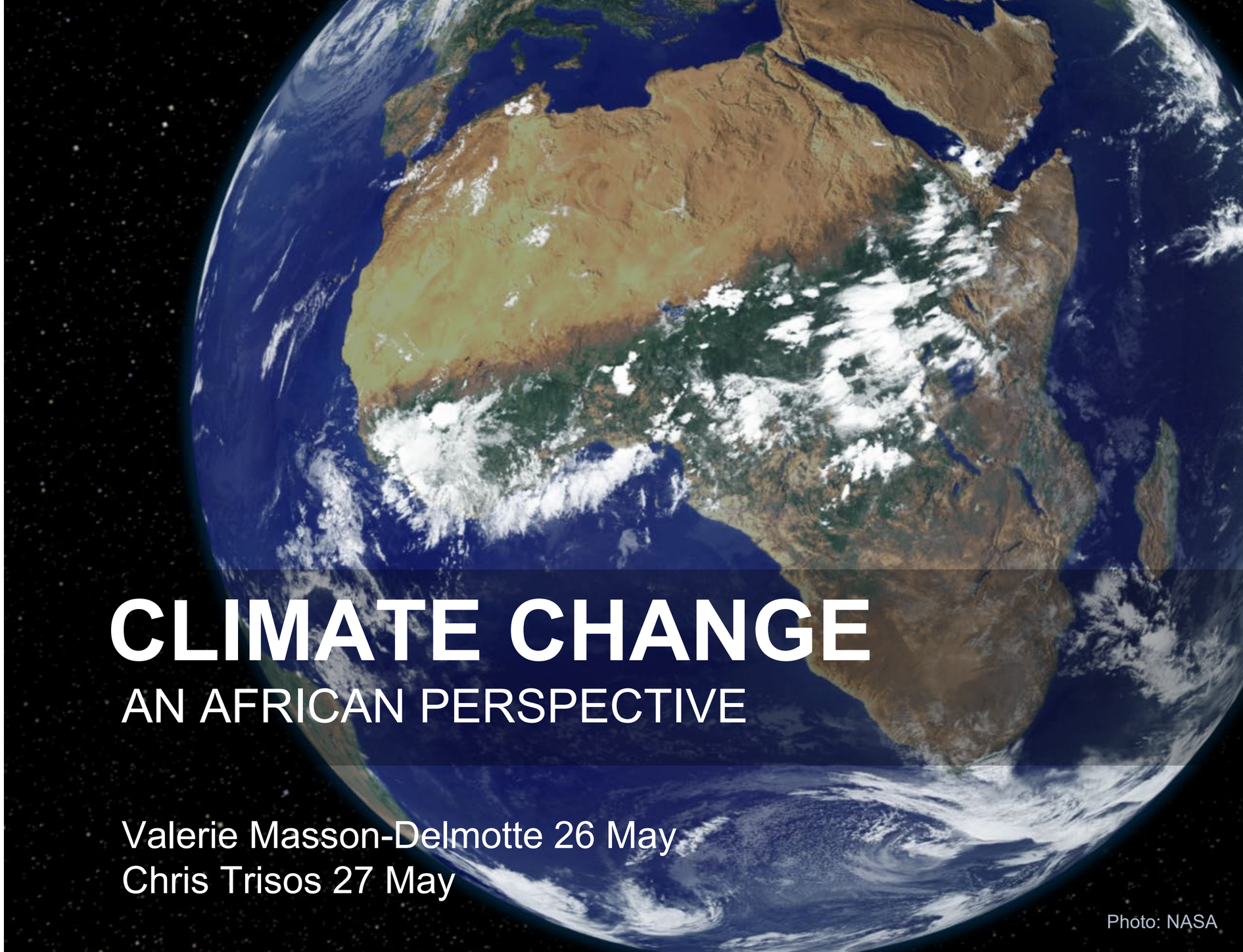
LIMITING GLOBAL WARMING TO 1.5°C



SOURCE: IPCC SR15, Figure SPM.3a

LIMITING GLOBAL WARMING TO 1.5°C

- Global energy
  - Renewable energy: two thirds of global energy by 2050
  - Coal phased out
  - Less energy overall, better efficiency
- Industry, construction, transport
- Carbon dioxide removal
- No single recipe for success

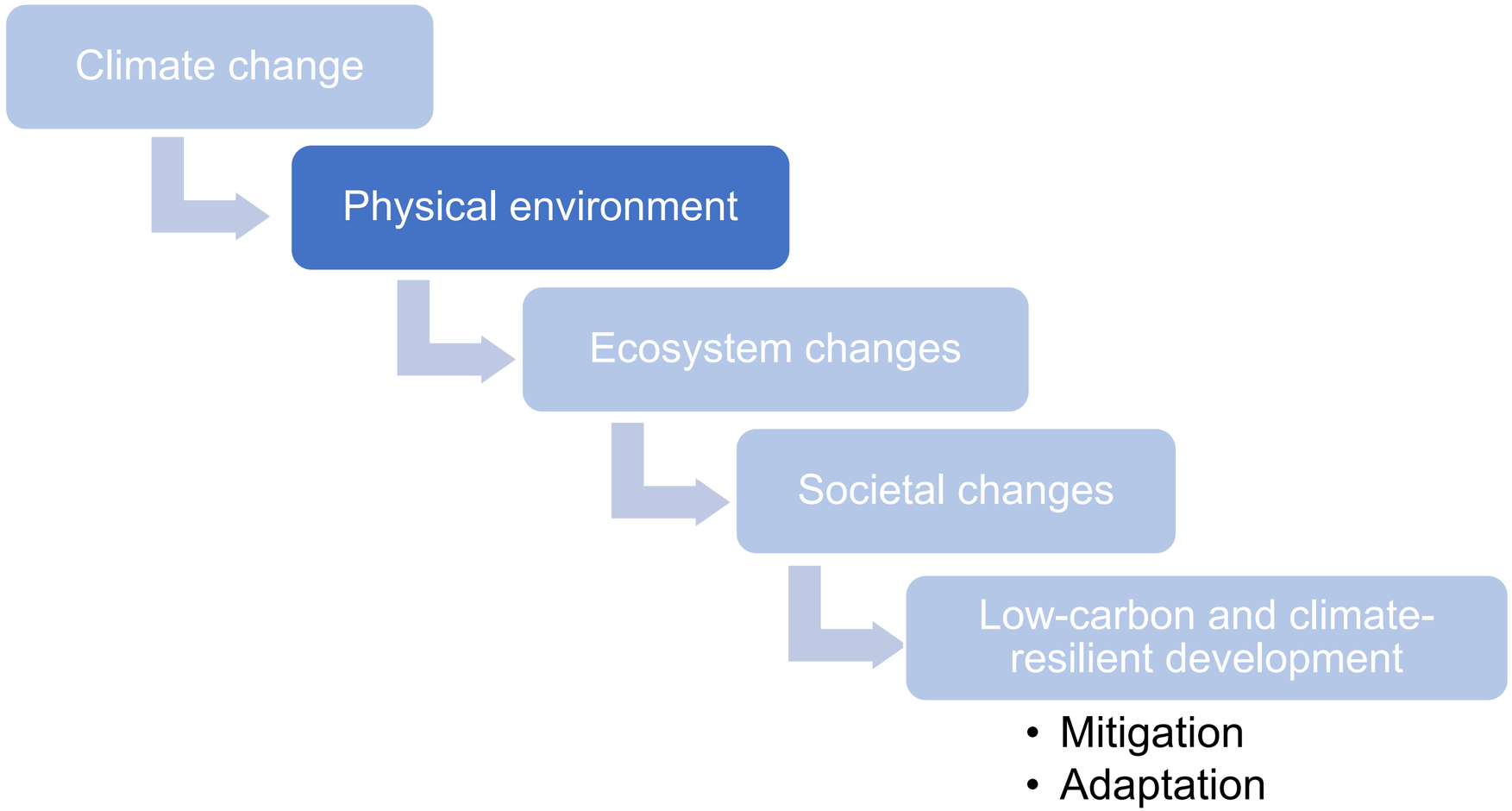


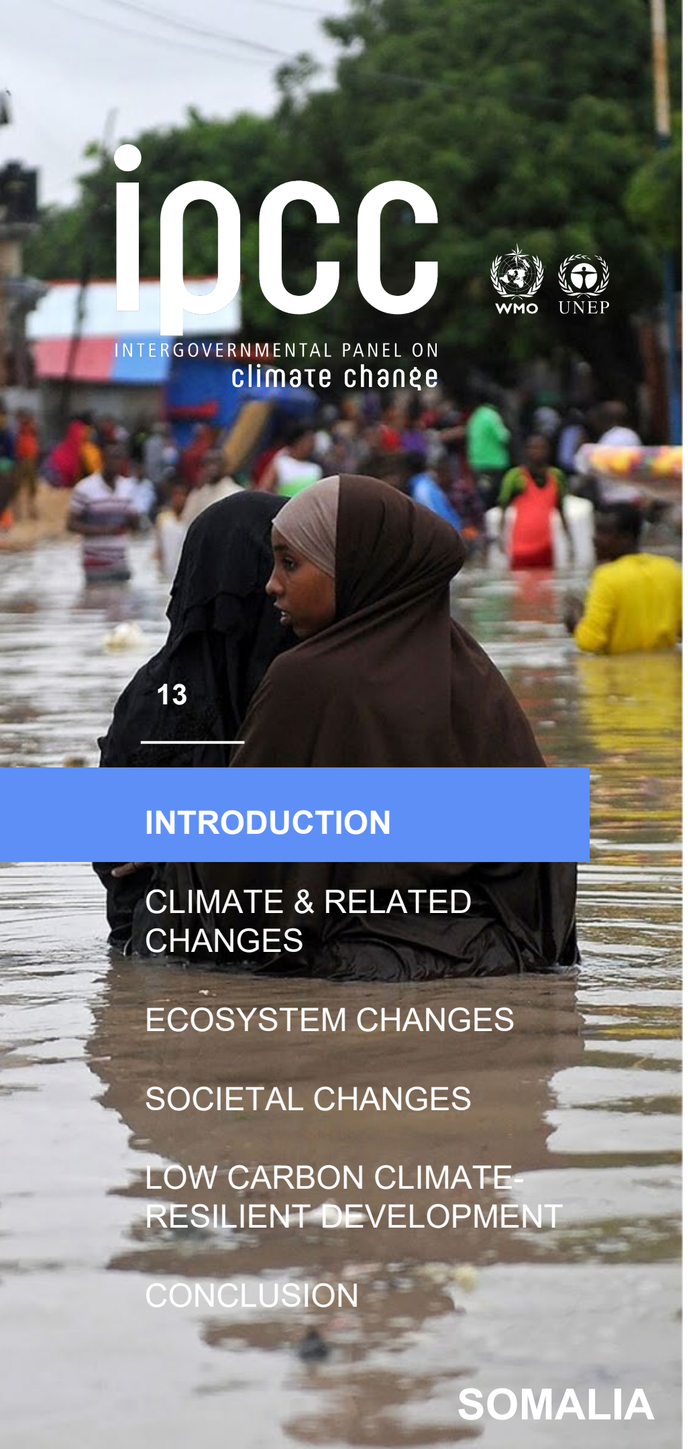
CLIMATE CHANGE

AN AFRICAN PERSPECTIVE

Valerie Masson-Delmotte 26 May
Chris Trisos 27 May

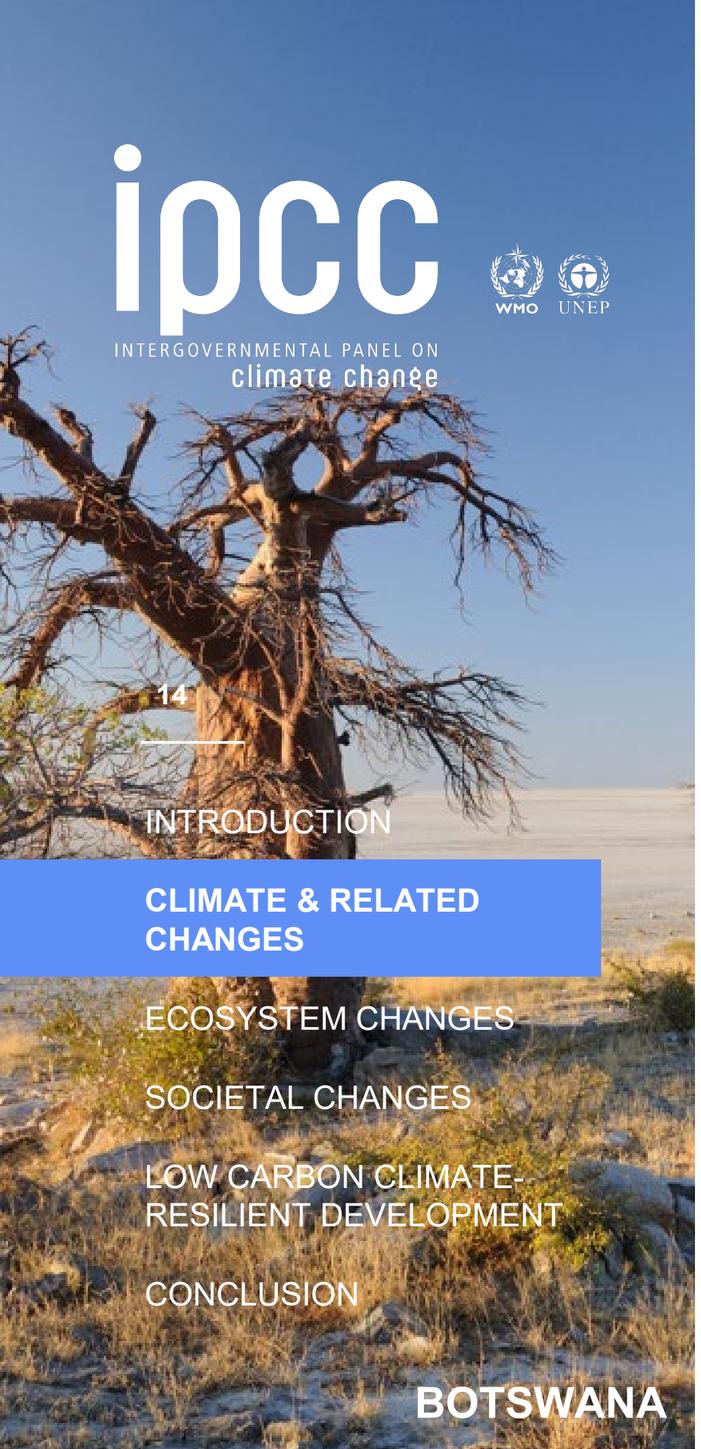
Photo: NASA





CURRENT EXPERIENCE OF CLIMATE CHANGE

- Rising temperatures, larger over land
- More frequent, intense climate extremes – such as heatwaves, heavy rainfall and drought
- Novel climates in tropics
- Sea level rise of 16cm, extreme water levels during high tides and storms
- Increased rain and wind speed of cyclones
- General lack of reliable data



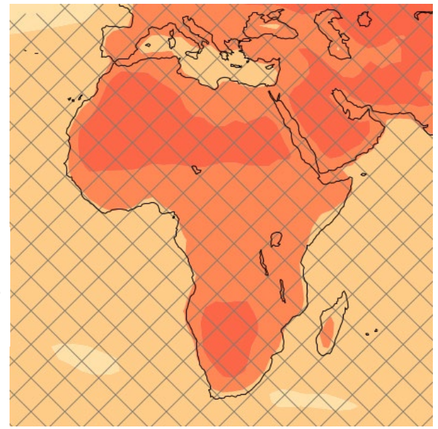
PROJECTED CLIMATE CHANGES

- Higher temperatures
  - Greater warming than global mean
  - Heat extremes: heat waves, hot nights
  - Rising frequency, intensity and duration

Temperature (°C)

0.5 1 1.5 2 3 4 6 8

Mean temperature change at 1.5°C warming

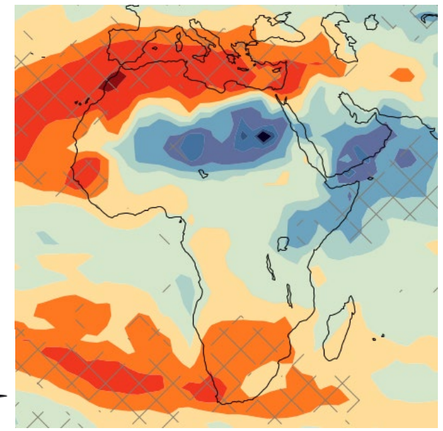


- Less rain
  - Dry spells, consecutive dry days, droughts
  - Extreme low river flows
- More rain
  - In Eastern Africa and central Sahel
  - Higher rainfall intensity and runoff

Precipitation (%)

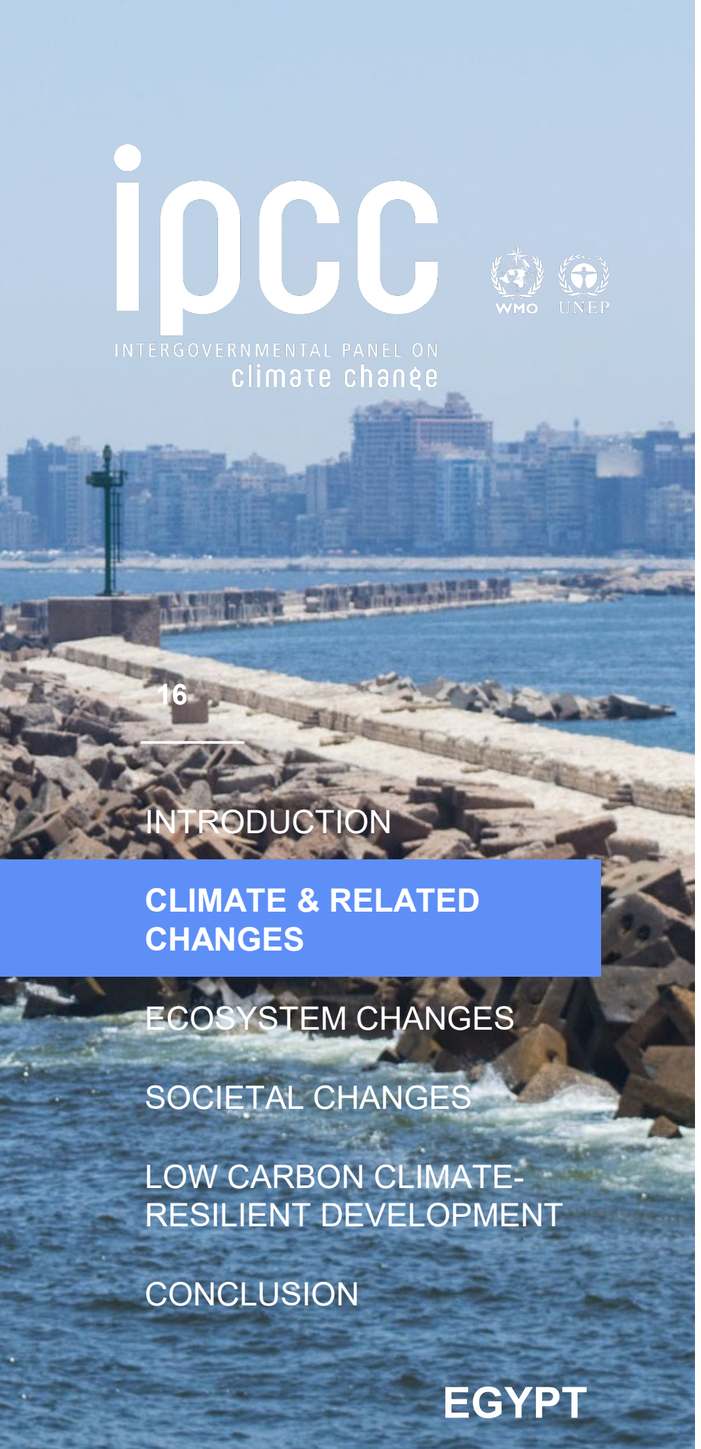
-20 -10 -5 0 5 10 20 30 40 50

Mean precipitation change at 1.5°C warming



FUTURE GLOBAL CLIMATE CHANGE HOTSPOTS

HOT SPOTS: IPCC SR15, Table 3.6



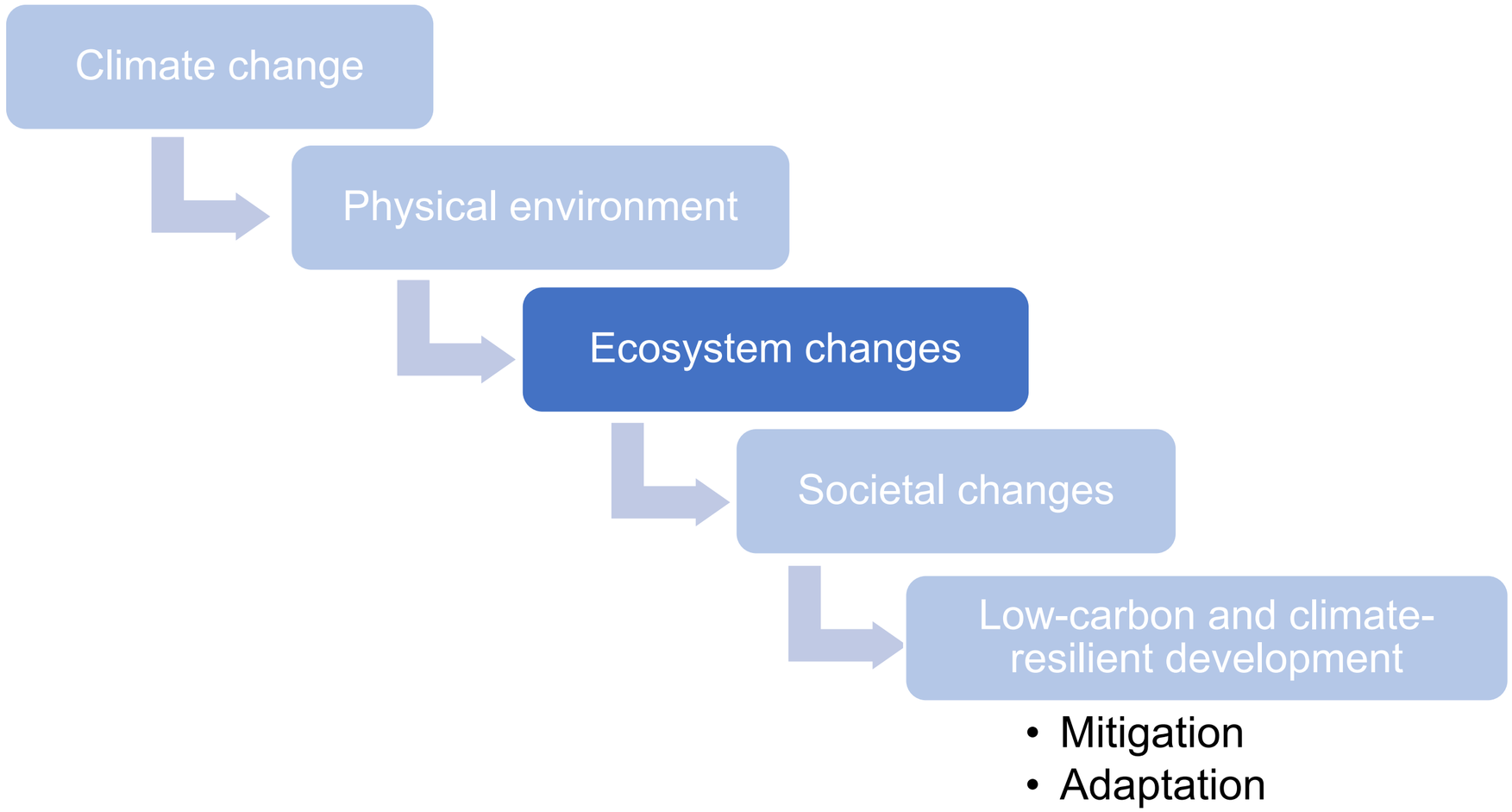
A CHANGING PLANET

SEA LEVEL RISE Even if warming is kept at 1.5 to 2°C, we might still see a rise in global sea level of up to 1 meter by 2300.

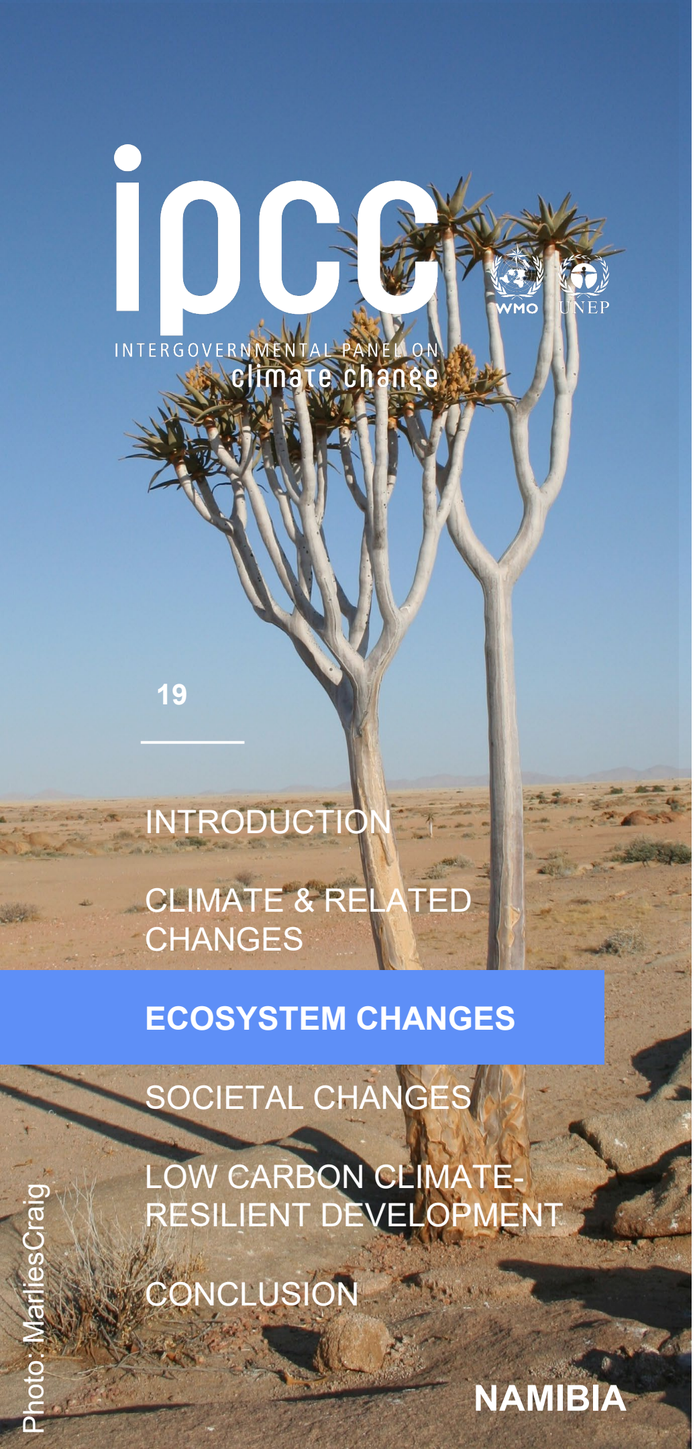
STORM SURGE By 2050, many coastal megacities will experience annual storm surge events, even if greenhouse gas emissions are reduced significantly.

SMALL ISLANDS The warmer the world gets, the more risks these communities will experience, including coastal flooding, sea level rise, and saltwater intrusion.

DELTAS Deltas are particularly at risk of coastal flooding from sea level rise



CLIMATE CHANGE & THE NATURAL WORLD



CLIMATE ZONES ARE SHIFTING

- Arid, dry areas are growing and shifting
- Novel and unprecedented hot climates in tropical regions
- Cooler zones are shrinking and shifting to higher altitudes and higher latitudes

OBSERVED REGIONAL CLIMATE ZONE SHIFTS: MEDITERRANEAN, SAHEL, ZAMBIA, AND ZIMBABWE

SUDAN

DESERTIFICATION

- Drought (frequent, prolonged, intense)
  - Caused and/or exacerbated by climate change
  - Droughts are hotter and thus more severe
- Human activities (exacerbated by drought)
  - Wood harvesting
  - Overgrazing, trampling, soil compaction
- Erosion from wind and water
  - Loss of soil fertility, lower water retention

- Data gaps
  - Extent of degraded land, vegetation maps

THE HORN OF AFRICA IS GETTING EVEN DRIER

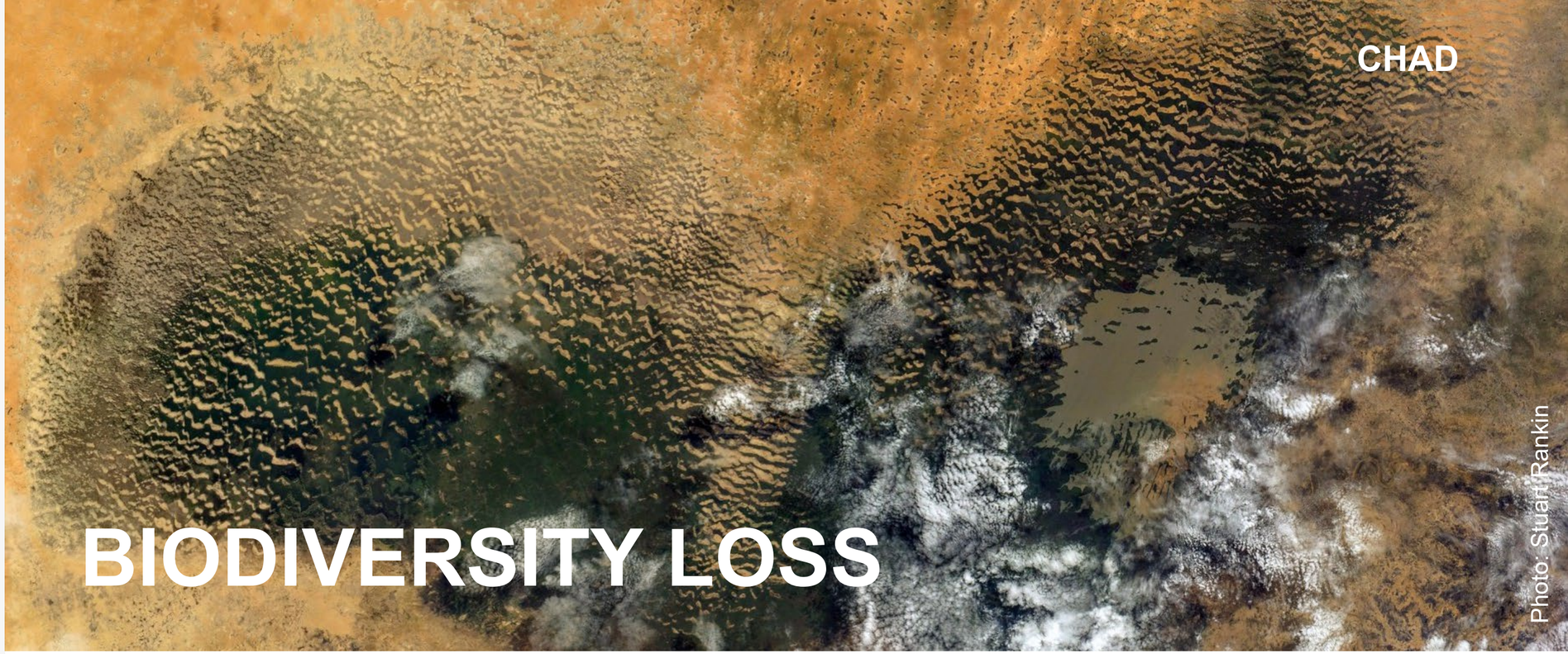
PROLONGED DROUGHT & OVERGRAZING

BIODIVERSITY LOSS

SOUTH-WESTERN ALGERIA

234 PLANT SPECIES
in 1978

95 PLANT SPECIES
in 2011



BIODIVERSITY LOSS

- Climate change
- Human factors (exacerbated by climate change)
  - Land use change, habitat pollution, over-exploitation
- Natural factors (exacerbated by human factors)
  - Invasive alien plants, pests, diseases, bush encroachment

EXTINCTIONS

- >2000 plant species in dryland areas could become extinct within 100 years.
- The Fynbos biome in South Africa could lose about 45% of its suitable growing area at 2°C warming.
- Limiting warming can help protect this rich habitat.

OASES

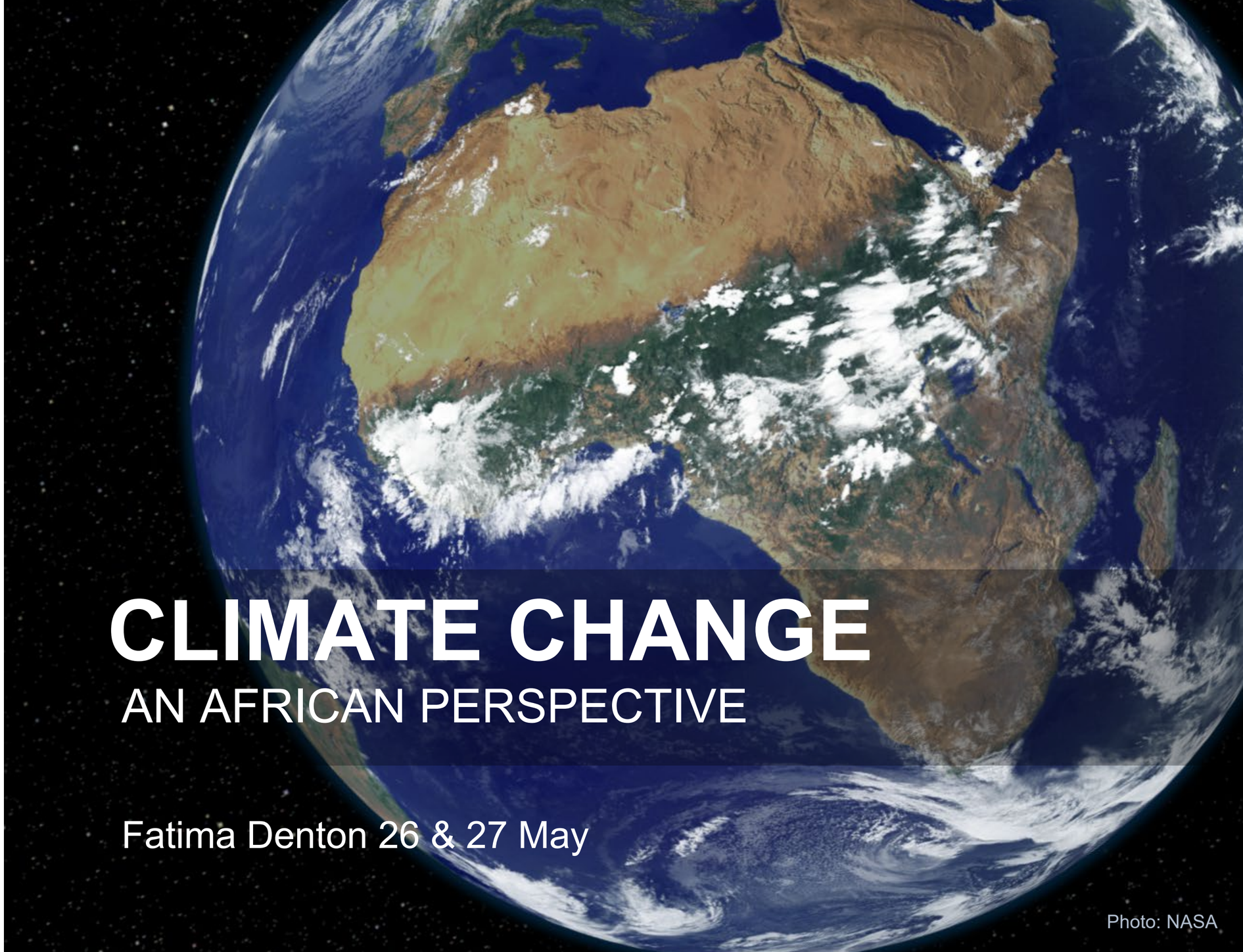
- Already
  - Water resources declining
  - Suitability for crops decreasing
  - Oases abandoned
- Future
  - Water demand exceeds supply
  - Too hot and dry for traditional crops

HIGH MOUNTAIN REGIONS

- Large populations live in highland areas
- Climate change impacts in natural and human systems
  - Knock-on effects on lowlands and oceans
- East African glaciers could lose >80% mass by 2100
- Deep concern experienced at local level

THE OCEAN

- Oceans absorb 90% of heat – ocean heatwaves
- Oceans absorb 20-30% of carbon dioxide – acidification, chemistry
- Water nutrients and dissolved oxygen
- Dead zones
- Distribution and abundance of marine life
- 70-90% of tropical coral reefs disappear at 1.5°C warming

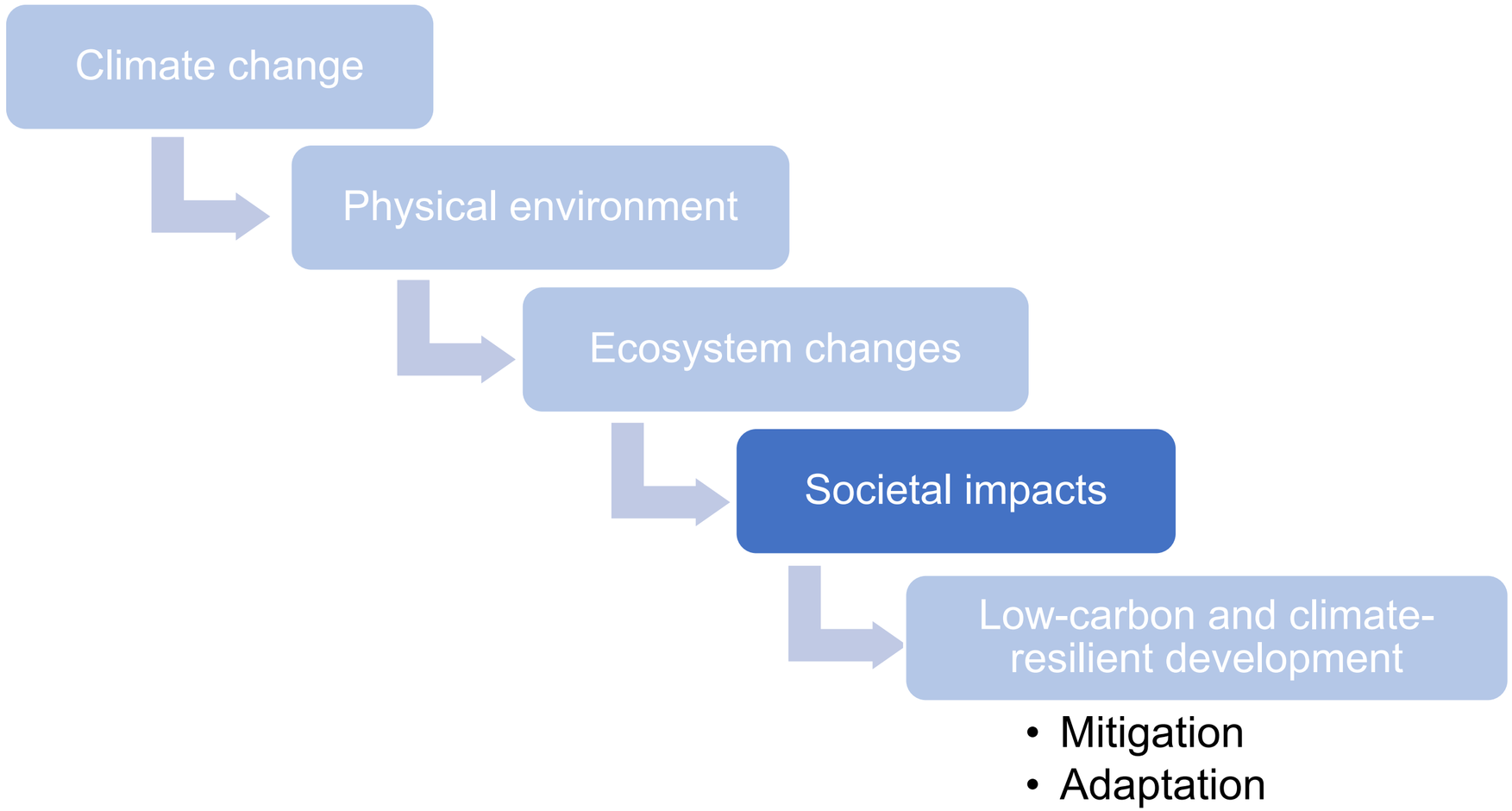


CLIMATE CHANGE

AN AFRICAN PERSPECTIVE

Fatima Denton 26 & 27 May

Photo: NASA



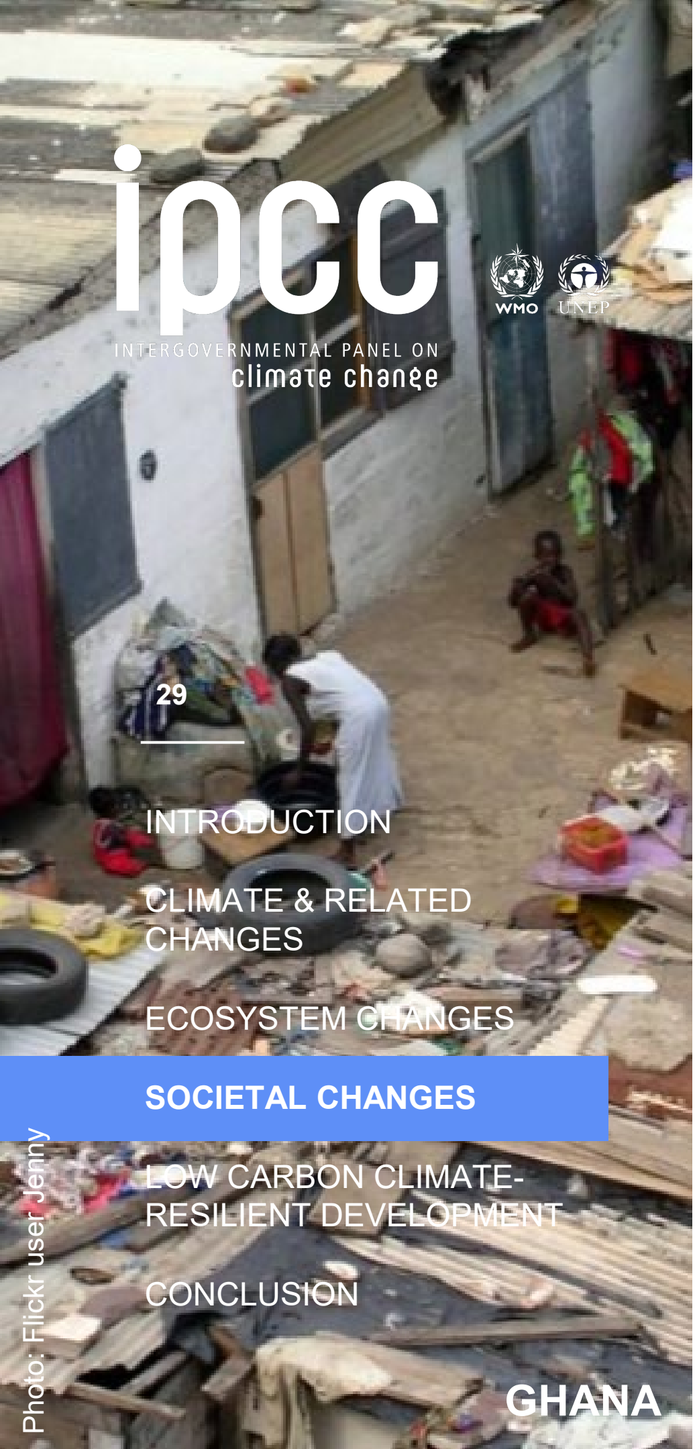


Photo: Flickr user Jenny

SOCIAL VULNERABILITIES

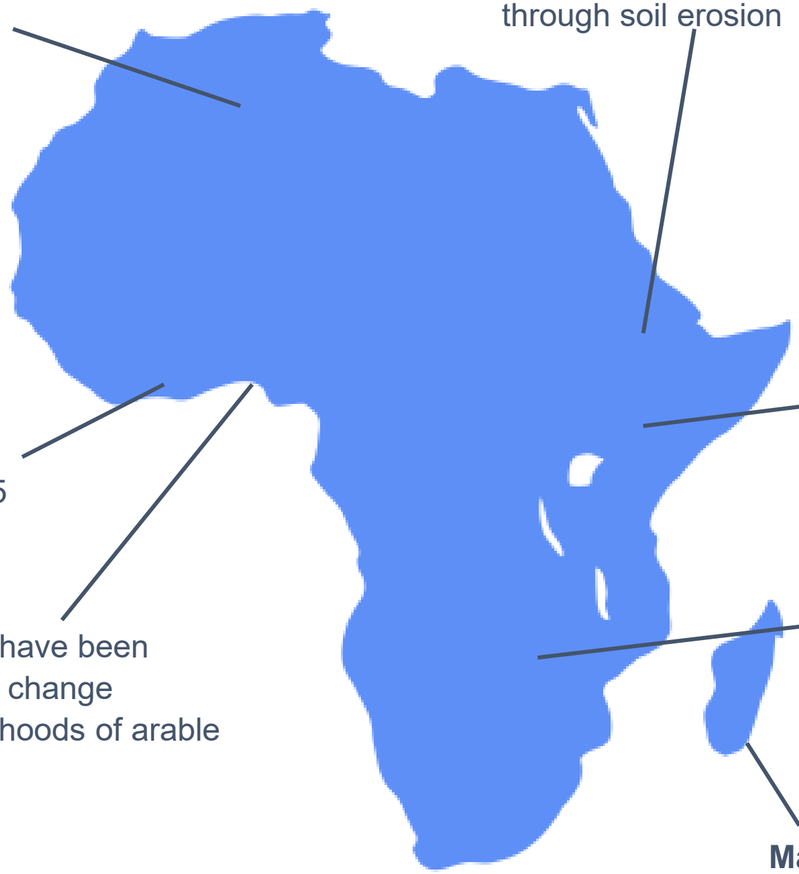
- Poverty, malnutrition, disease
- In sub-Saharan Africa 41% live in extreme poverty
- Multidimensional poverty: combination of deprivations
- Vulnerable areas: drylands, coastlands, cities, informal settlements
- 85-95% of people who are vulnerable and exposed to climate risks live in Africa and Asia
- Food insecurity, food prices, income losses, livelihoods, health, displacement
- Vulnerable groups: subsistence farmers, indigenous people, local fishing communities, women, children and the elderly
- Women: significant labour force, limited by gender inequalities

CAMEROON

“The biggest climate change impacts can be seen in the **food, agricultural and health sectors**, with knock-on effects on poverty, the economy, migration and conflict.

DEBRA ROBERTS
CO-CHAIR
IPCC WORKING GROUP II

FOOD & AGRICULTURE IMPACTS ACROSS AFRICA



Some oases in northern Africa have been abandoned

Farmers in Ethiopia lose about 220 US $ per hectare through soil erosion

Reduced productivity led to higher prices, negatively affecting food security, especially in **sub-Saharan Africa**

In pastoral lands across Africa lower animal growth rates and productivity

One third of people under-nourished in **sub-Saharan and East Africa**

Poverty rate **in Ghana** increased by 5.4% in 2015 from loss of productivity

Ethiopia and southern Africa, 2015/16, worst drought in 50 years, 28 million people needed food aid

In Nigeria, there have been reports of climate change affecting the livelihoods of arable crop farmers.

Malagasy farmers vulnerable to shocks from extremes

ipcc
INTERGOVERNMENTAL PANEL ON climate change

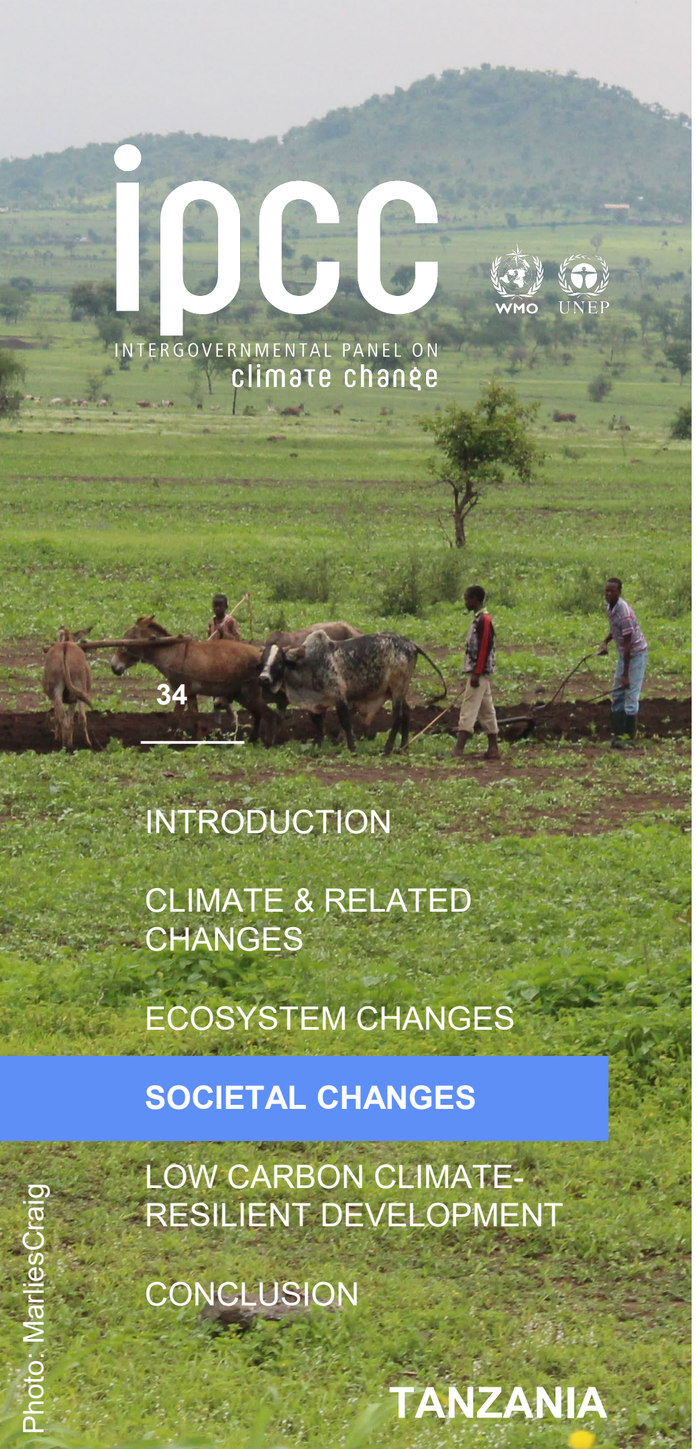
WMO UNEP

> **Food security will be increasingly affected** by future climate change through yield declines – especially in the tropics – increased prices, reduced nutrient quality, and supply chain disruptions.

YOUBA SOKONA
VICE CHAIR, IPCC

FOOD SECURITY

- 11% of global population has decreased food security
- 20% of these live in Africa
- 31% of undernourished populations live in Africa (about 254 million)
- Heat and dryness impact on agriculture
- Made worse by other human activities



FOOD SECURITY

- Crop yields
  - Staples: 15% reduction in 11 major global crops, by 2050 at 1.5°C
  - Vegetables, cash crops like cocoa, coffee, cotton, peanuts
- Area suitable for crops
- Agricultural productivity
  - 17–22% loss, by 2050 at 1.5°C
  - 23% more cropland needed to compensate (>3m km^2 globally)
- Lower nutritional quality due to rise in CO_2

FOOD SECURITY

- Loss of agricultural productivity & income
- Loss in livestock productivity and growth rates, spread of pests and diseases
- Food price spikes, famines
- Loss / deterioration of agricultural land
  - Large-scale corporate land acquisition
  - Commercial agriculture expanding into rangelands
  - Fragmentation of habitats
  - Loss of vegetation, desertification, soil erosion, sea level rise
  - Bush encroachment, spread of alien invasive plants
- Increased vulnerability to extreme events
  - Geographical isolation, lack of access, lack of social safety nets

FISHERIES

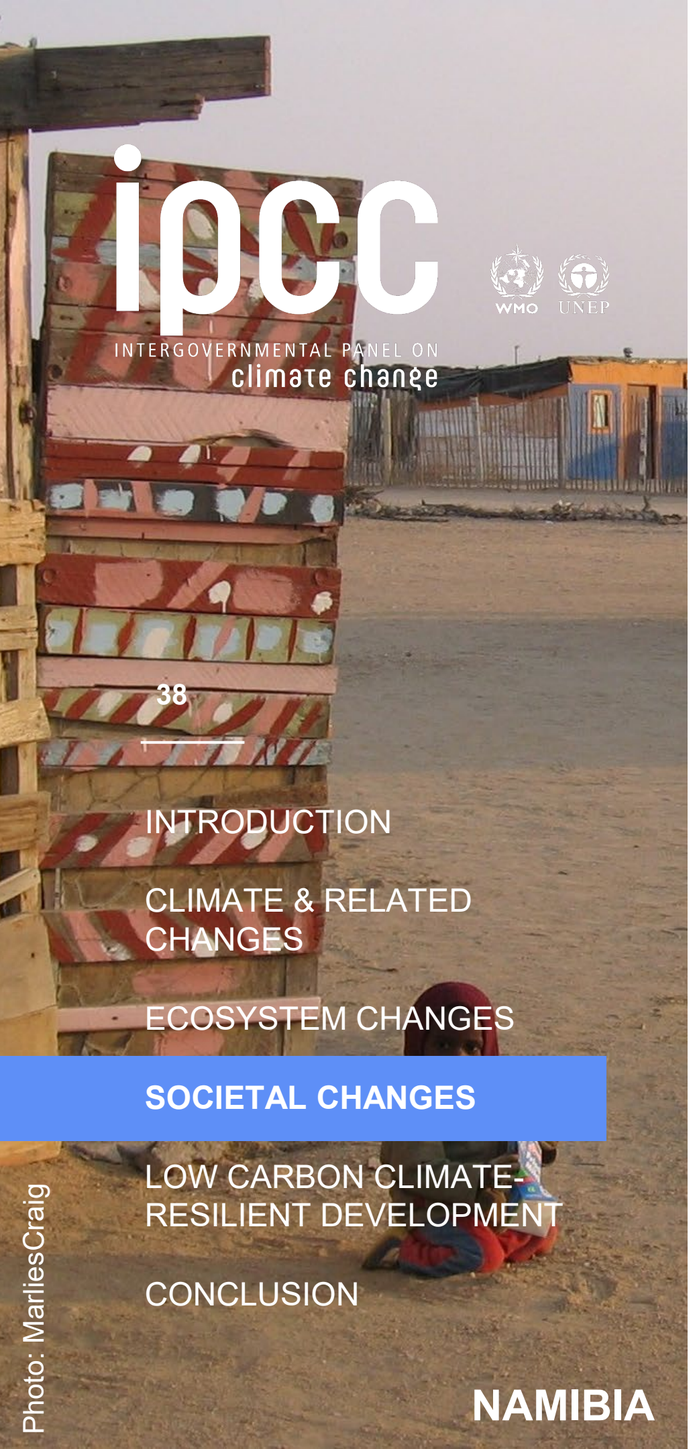
- 90% of the world's rural poor live in coastal areas of 15 countries, including Africa
- ¼ to ⅓ of dietary protein and micronutrients from seafood
- Decline in fishing revenues in 89% of countries, by 2050
- >25% decrease in maximum fish catch potential

HEALTH AND WELLBEING

- Undernutrition and malnutrition
  - Stunting, wasting
- Disease
  - Vector-borne, water / food-borne
- Deadly heat stress
- Air quality
  - Dust, related meningitis, fire smoke
  - Data gap

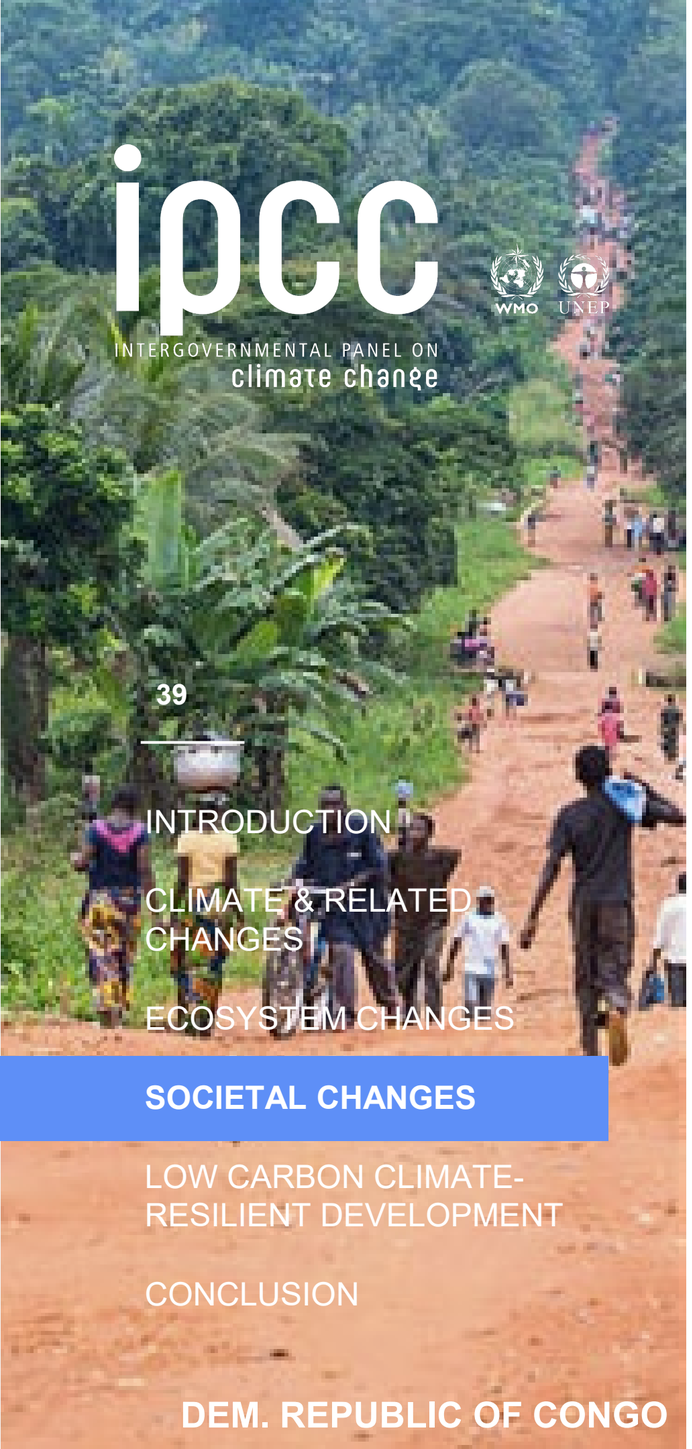
Excess deaths per year from climate change by 2030 compared to 1961-1990

	Africa & Middle East	World
Childhood undernutrition	68 200	95 200
Malaria	57 500	60 100
Diarrhoea	31 900	48 100
Heat stress	4 900	37 600



POVERTY

- Climate change is a poverty multiplier
  - Making poor people poorer
  - Increasing number of people living in poverty
- 3 to 16 million people forced into poverty by 2030
  - Agriculture, food prices
- Food security, water-security, energy, well-being less challenging at 1.5°C than at 2°C or higher
- Exposure to climate risks 20x lower in:
  - sustainable socio-economic development (50 million exposed) *versus*
  - high poverty and inequality (1 billion exposed)



CONFLICT AND MIGRATION

Conflict

- Land degradation – productivity – violent conflict
- Increased dryness – food riots
- Existing conflict – reinforced / sustained

Migration

- Droughts, food / water shortage, flooding, sea level rise
- Seasonal / permanent migration
- Rural – urban movement
- 10% less rain → 4.5% increase in urbanization (SSA, 1950-2000)
- East Africa coastal outmigration: projected 750 000 between 2020-2050

ECONOMY

- Infrastructure at risk from storms, floods, sea level rise
  - Railways at risk of sand movements
- Reductions in economic growth
- Widening income inequality

- Highest tourism sector risks for least developed countries
  - Tourism >15% of national economy
- Africa's tourism assets increasingly at risk
  - Tourist facilities, natural assets

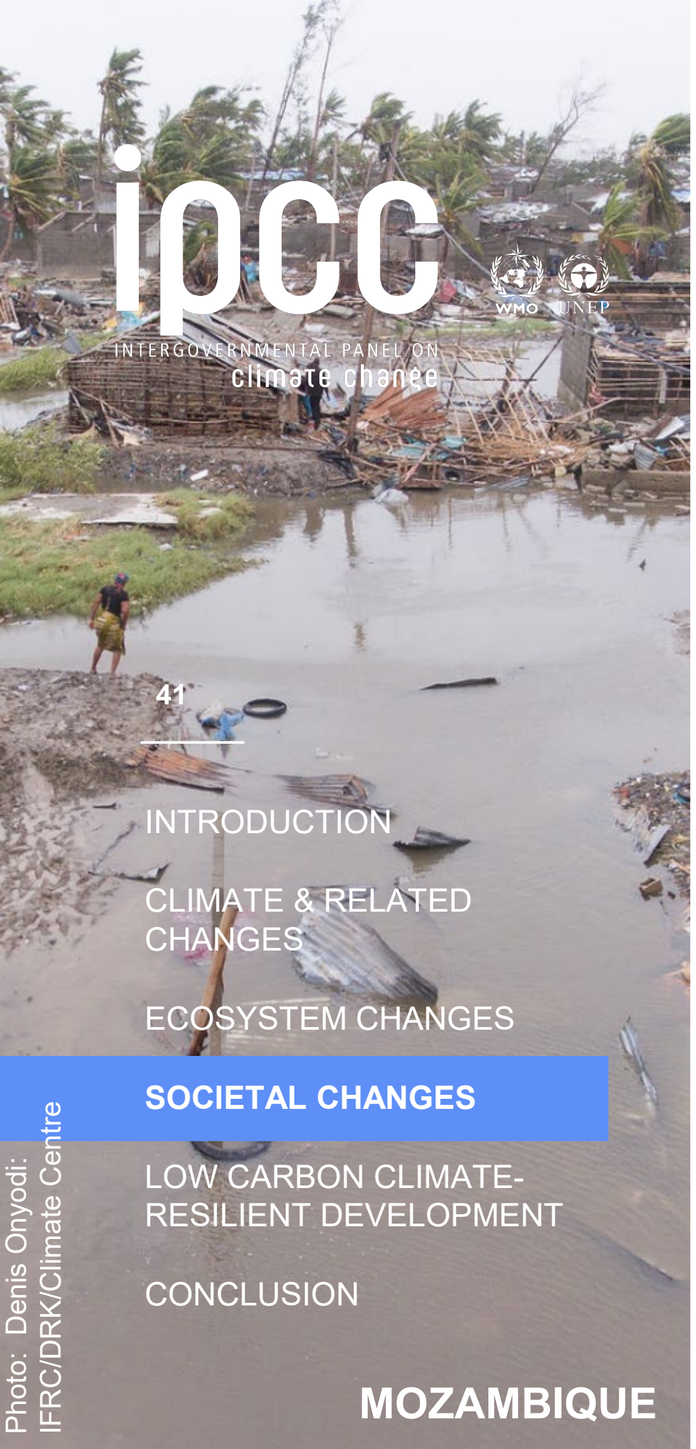


Photo: Denis Onyodi: IFRC/DRK/Climate Centre

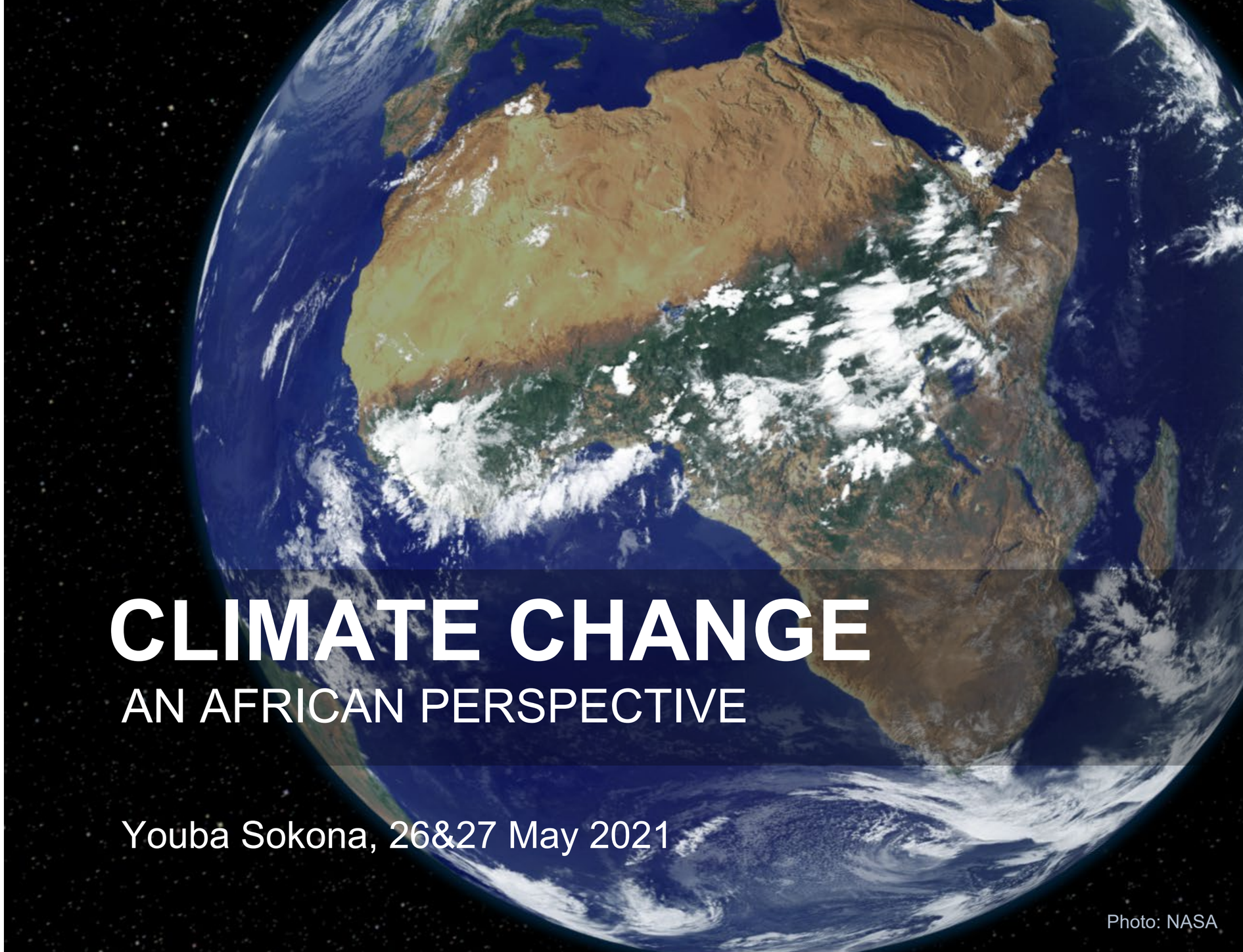
CASCADING AND COMPOUND EFFECTS

- **Cascading effects:**
  - **Desertification** – migration to marginal land – environmental degradation – livestock & crop losses – hunger – out-migration – food riots – economic collapse
  - **Flooding** – harvest failure – loss of employment – drop in wages – failure in trade and informal safety nets – livestock sales – drop in food prices – grain production stops – no food imports – livestock disease – food shortage – escalating food prices
  - **Ocean changes** – coral reef damage – fisheries – food – economics

- **Compounding effects:**
  - Heat & drought & flooding & food security & health crisis & wildfire & conflict & poverty & economic crisis

URBAN IMPACTS

- Cities concentrate climate related risks
  - Deadly heat stress, flooding, water poverty, landslides, fire, diseases
  - Affecting people, services, infrastructure
  - Adding to existing problems around poverty, exclusion, governance
  - Sea level rise in coastal cities threatens critical infrastructure
  - Informal settlements at particular risk
- Cities also concentrate opportunities for change

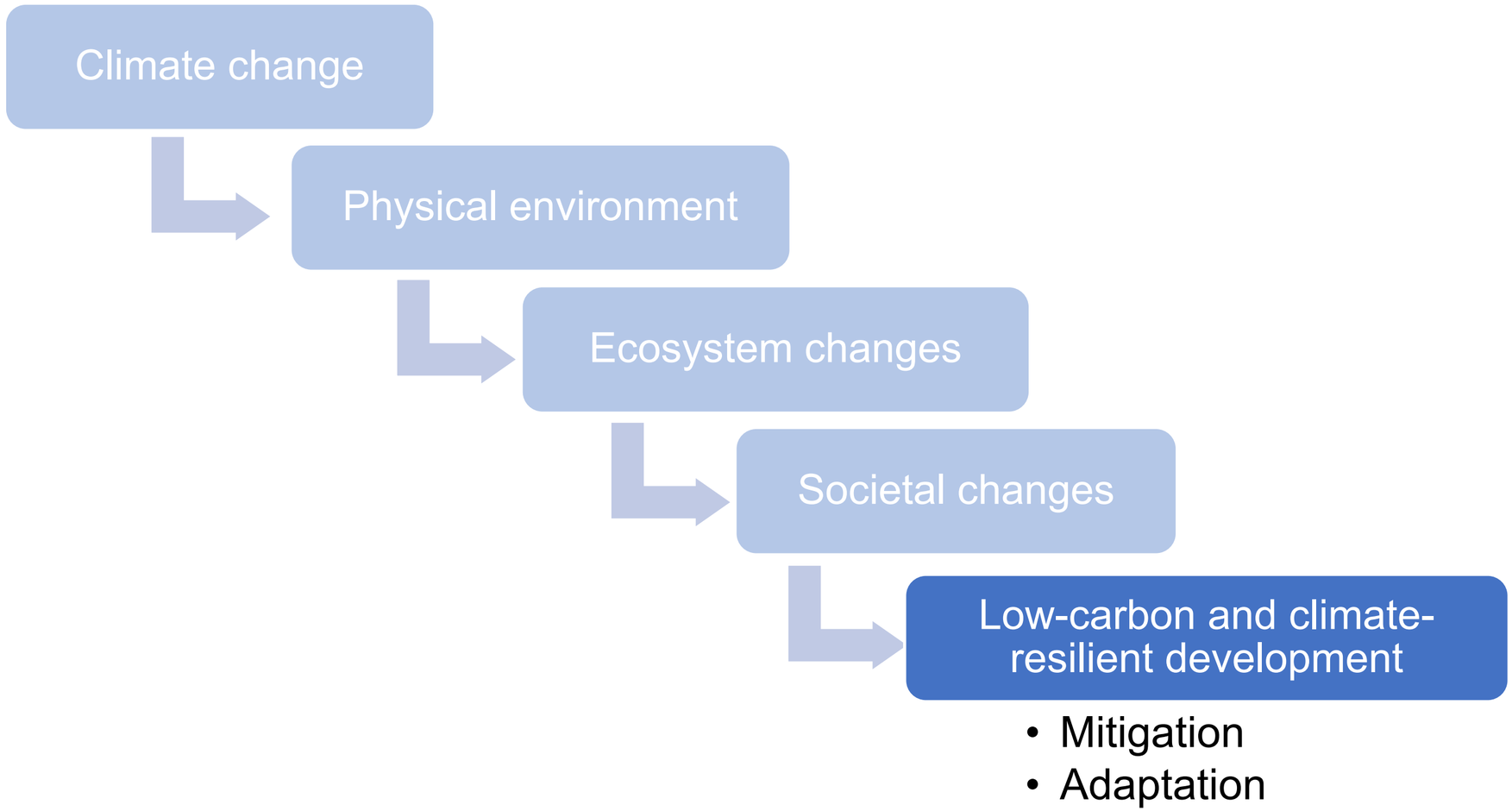


CLIMATE CHANGE

AN AFRICAN PERSPECTIVE

Youba Sokona, 26&27 May 2021

Photo: NASA



TRANSFORMATION FOR AFRICA

- Climate-resilient, low carbon development
- Adapt to unavoidable climate change impacts
- Reduce poverty, hunger, malnutrition
- Improve health and livelihoods
- Affordable, clean energy
- Clean water
- Finance

Photo: Clean Cooking Alliance

TRANSFORMATION: ENERGY

- Energy poverty
  - Wood and charcoal: forest degradation, deforestation
  - Health problems associated with indoor smoke, fire hazard
  - High electricity prices unaffordable for poor households
- Affordable clean energy (solar, wind, hydro) – energy security
- Policies to incentivize and regulate supply; investment
  - Reduced health risks, hard labour, safety, school enrolment, agency, income opportunities

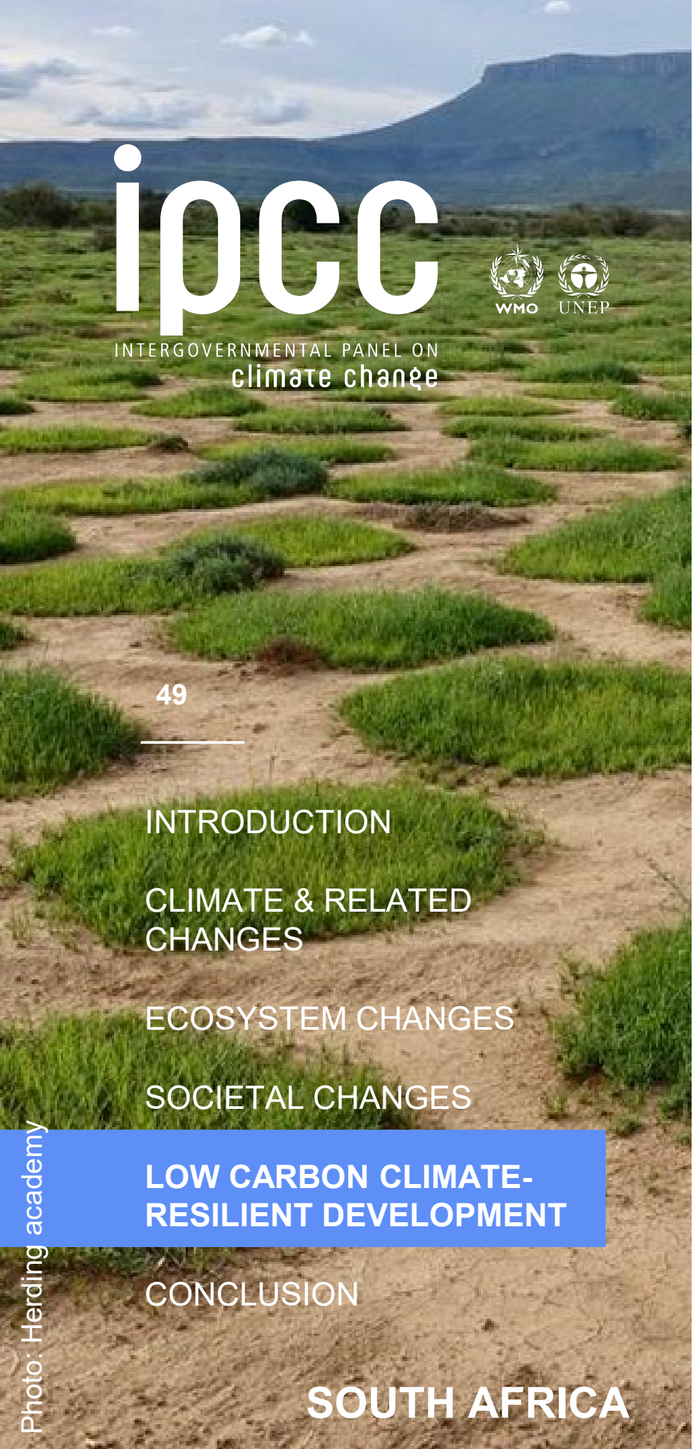
TRANSFORMATION: ENERGY

- Renewable energy: cost and feasibility
  - Political, economic, social, technical
- Solar power: major opportunities and co-benefits at all scales
  - Cities, farming communities, large scale power plants
- Hydropower: potential for growth, risks for water security
- Bioenergy: potential for renewable energy, potential trade-offs
  - Sustainable options: waste steams, land restoration, low-input

Photo: (cropped): CTB/Josiane Droeghag

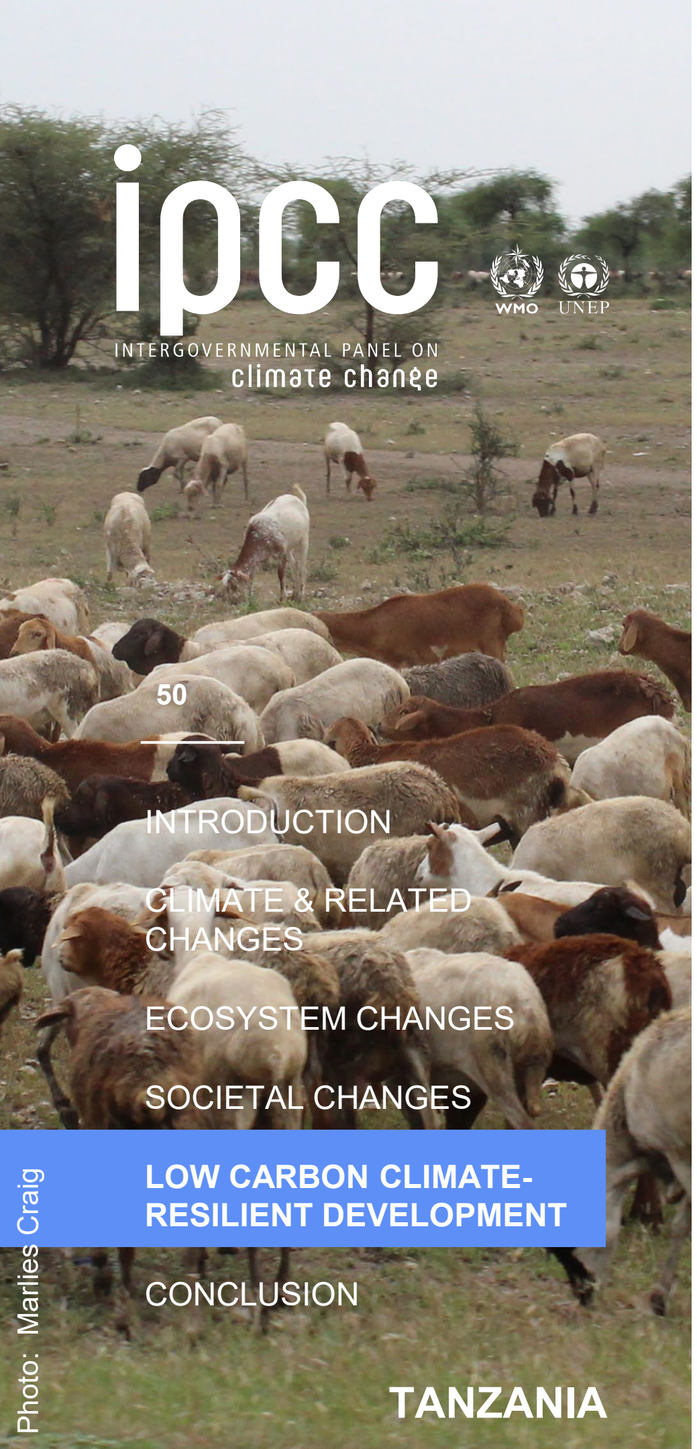
TRANSFORMATION: LAND

- Sustainable agriculture
  - Improve food and water security
  - Protect against disease
  - Provide energy, fibre and building materials
  - Provide income from cash crops
  - Protect and preserve biodiversity and ecosystems
  - Contribute to climate change mitigation



CLIMATE RESILIENT AGRICULTURE

- Intensification
  - Fertilizer application, precision agriculture, seed priming
  - Land surplus, restoration / reforestation
  - Commercialization, diversification
- Conservation agriculture
  - no/minimum tillage, mulching, cover crops, crop rotation
  - mixed cropping, crop-livestock mixes
  - integrating trees into croplands and rangelands (agroforestry)
  - flood-proofing crops, rainwater harvesting
- Improved logging practices, better reporting
  - protecting existing forests and peatlands
- Removal of invasive alien plants
- Land restoration
  - Monetary returns can be 3 to 6-fold over a 30 year period



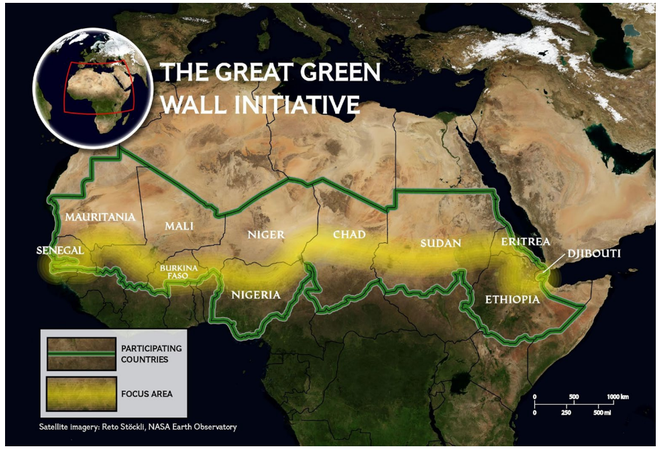
LIVESTOCK AND FISHERIES

- Importance of livestock in Africa
  - Food security, especially with increasing crop failures
- Options for adaptation in livestock
  - Rainwater capturing, seasonally alternating use of rangelands, rotational grazing, careful livestock breeding and selection, management of woody plants (e.g. bush encroachment), livestock feed that is unsuitable for human consumption, shifting from cattle to camels
- Indigenous and local knowledge
- Options for adaptation in fisheries
  - Financial aid, accessing new fishing grounds, fair or preferential distribution of harvest, improved fishing gear, insurance

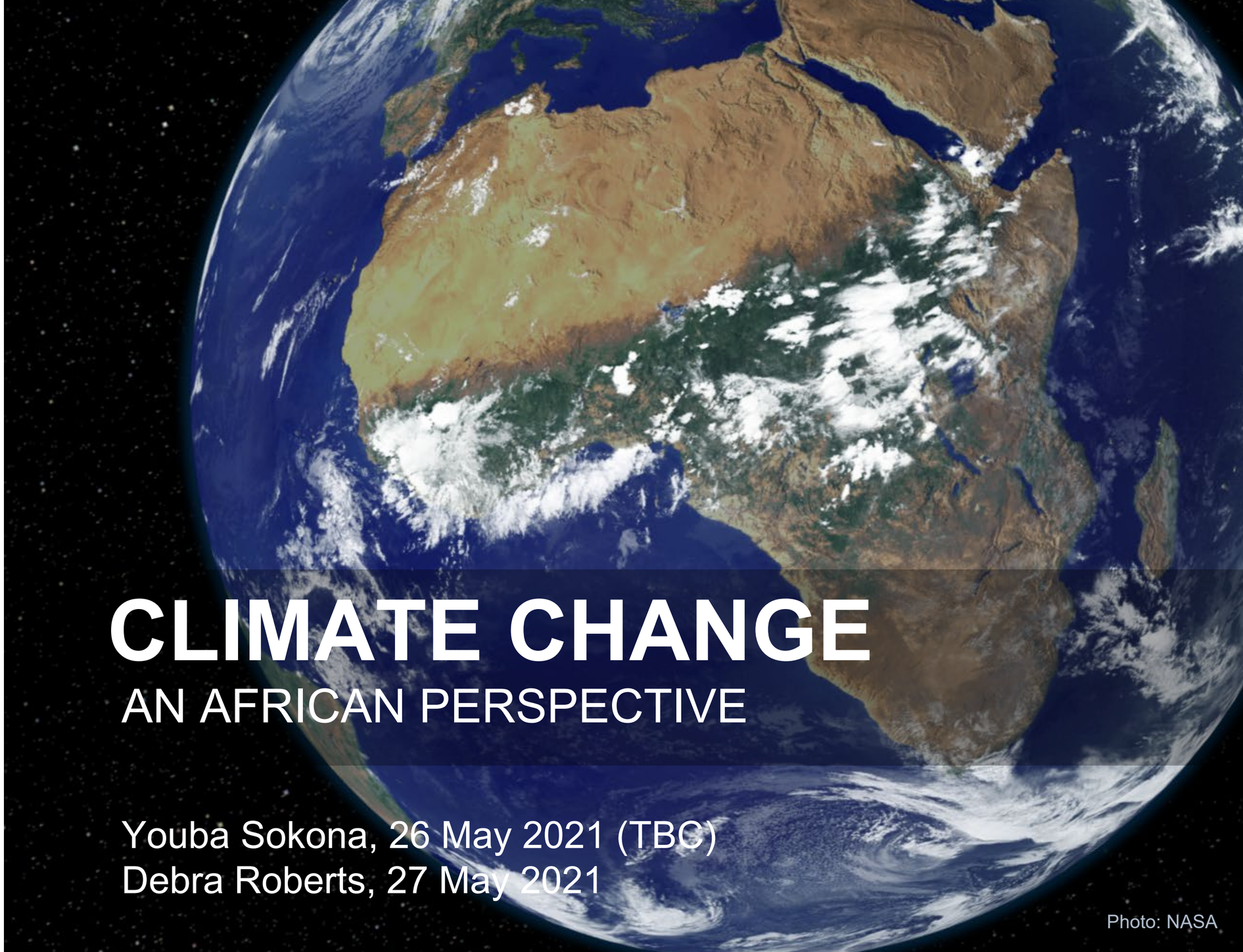
REFORESTATION / TREE PLANTING

- Managed natural regeneration
- Watershed rehabilitation
- Tree planting (reforestation / afforestation)
  - Biodiversity, ecosystem function
  - Food and water security
  - Reduce poverty, improve social capital, avoid out-migration
  - Reduce sand storms and wind erosion, improve micro-climates, soil nutrients, soil water retention
  - Contribute to mitigation

SMALL-SCALE PROJECT



LARGE-SCALE PROJECT



CLIMATE CHANGE

AN AFRICAN PERSPECTIVE

Youba Sokona, 26 May 2021 (TBC)
Debra Roberts, 27 May 2021

Photo: NASA

Photo: GATETE Pacifique

TRANSFORMATION: URBAN & INFRASTRUCTURE

- Sustainable development of healthy urban areas
  - Green buildings and suburbs, clean water, renewable energy, sustainable transport and connectivity, healthy environment
- Urban agriculture
  - Food security, reduced transport, recycling of waste
- Inclusive and fairer cities
  - Public participation, civic rights, multiple stakeholders

URBAN CLIMATE RESILIENCE

- Durban Climate Change Adaptation plan
  - Harnesses nature to address flooding, coastal erosion, water pollution, wetland siltation, climate change
- Nile and Niger delta: flood walls, flood-proofing
- Beira and elsewhere: green spaces, water ways and other natural features
- Mangrove restoration, green spaces along rivers

TRANSFORMATION: INDUSTRY

- Energy (metals, chemicals, minerals); cement, foam, refrigeration
  - Electrify, energy efficiency, renewable energy
  - Low carbon processes and materials, substitution, carbon storage
  - Circular economy principles: avoid waste, keep products in use, recycle
- Food industry
  - Harvest / post-harvest technology, processing, transport, storage, including cold storage

GOVERNANCE

- Decentralized governance can empower people
- Informal governance / customary systems can improve land security and management of communal resources
- Policy effectiveness can bring significant benefits

CAPACITY, KNOWLEDGE SHARING & TECNOLOGY TRANSFER

- Investing in capacity building and education can improve adaptation
- Early warning systems can lead to better preparedness
- International collaboration can play a critical part in tackling and adapting to climate change
- Technology development and transfer is an enabler of both mitigation and adaptation

FINANCE

- Investment in adaptation finance is needed
  - 18-25% of climate finance flowed into adaptation in developing countries
  - USD 140-300 billion per year needed in developing countries
  - In 2014 USD 22.5 billion adaptation funding was available
  - US$ 1 spent - US$ 2.30-3.30 net benefits
- Climate insurance
  - Social protection against existing and novel climate related risks
  - Enables proactive adaptation, protects livelihoods, improves food security

UNITED NATIONS

"Limiting warming to 1.5°C can go hand in hand with achieving other world goals.

Everything is connected.

HOESUNG LEE
IPCC CHAIR

THANK YOU!

[CONTACT INFORMATION]
[EMAIL]