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Climate risks and assessments fundamentals

Rabat, 05th October 2022

By Elidaa K. DAKU

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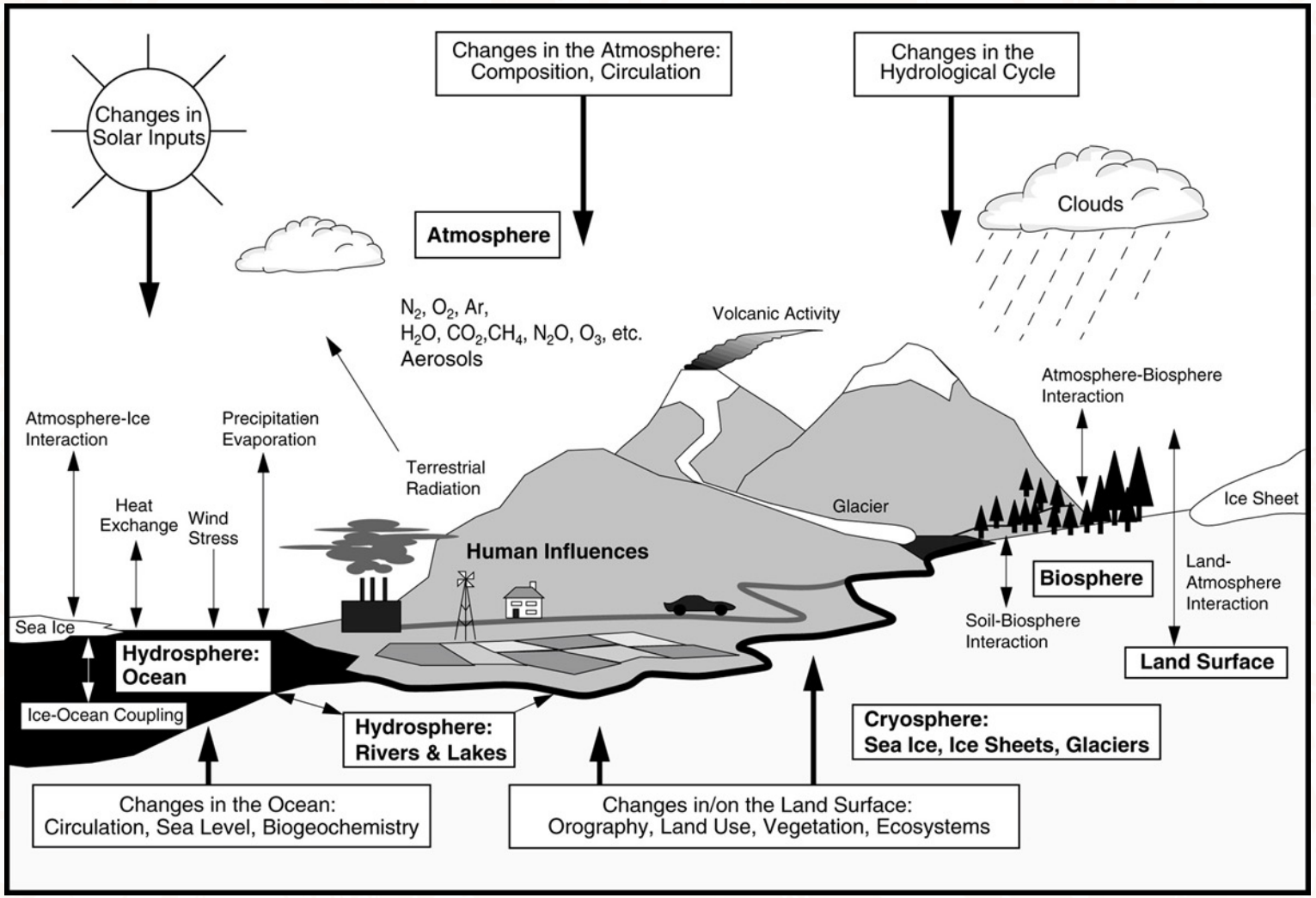
Fundamentals

Brief introduction to the climate system, its drivers, its variability, ways to predict future changes, and how to assess these changes.

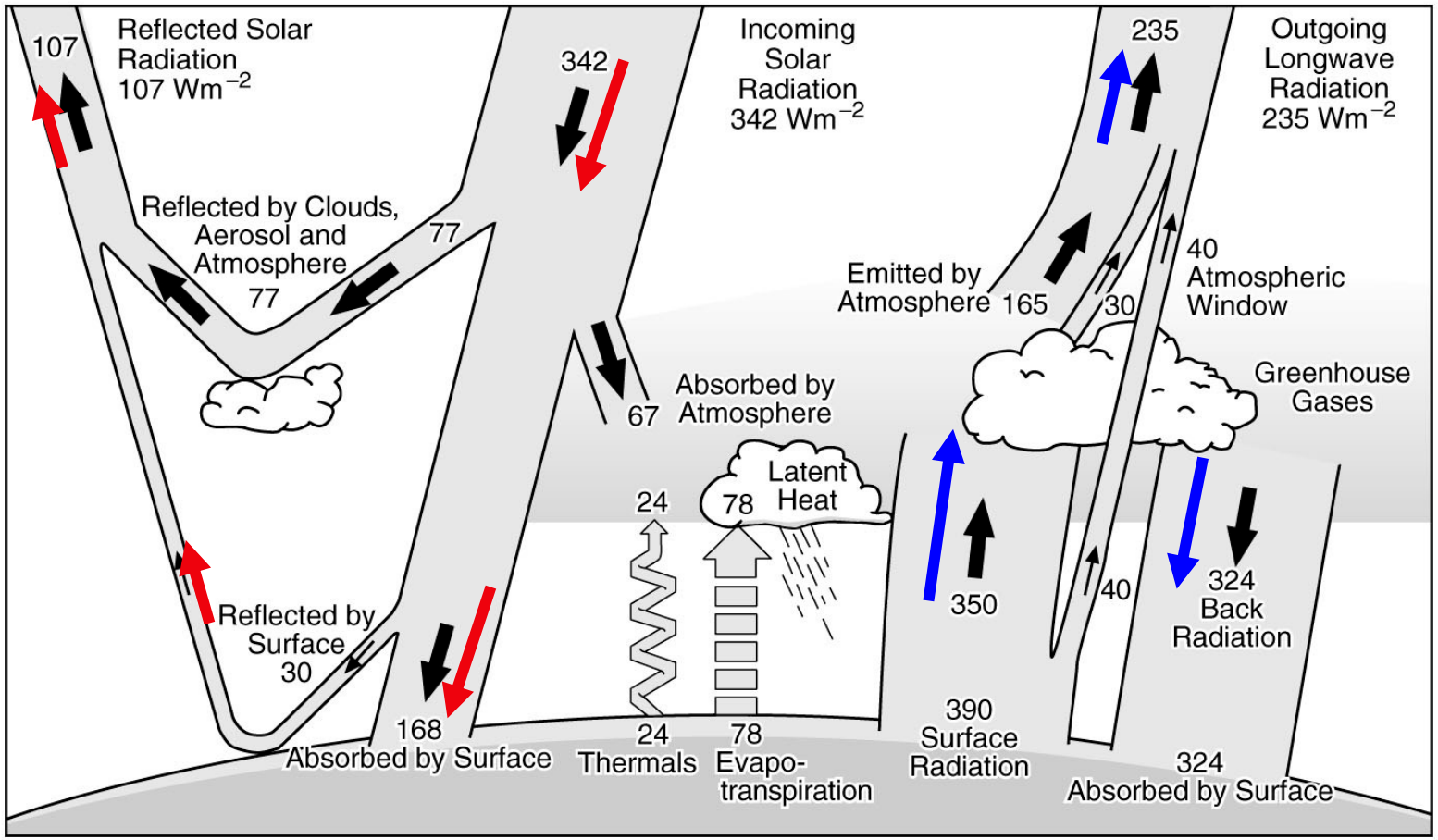
What is the climate system?

A **complex system** composed of various **dynamics components** (the atmosphere, the ocean, the land surface, the ice and snow cover, and its features), with many mutual **interactions** between them, and a **large variety of physical, chemical, and biological processes** taking place in and among these components



What drives the Climate?

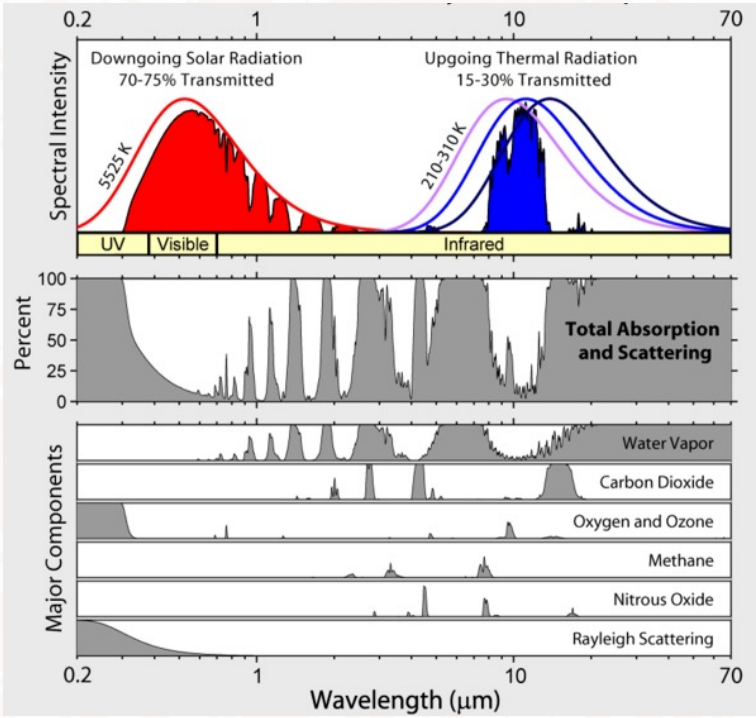
The climate system is driven by incoming **solar radiation** (which is absorbed and reflected), and transform into outgoing longwave radiation

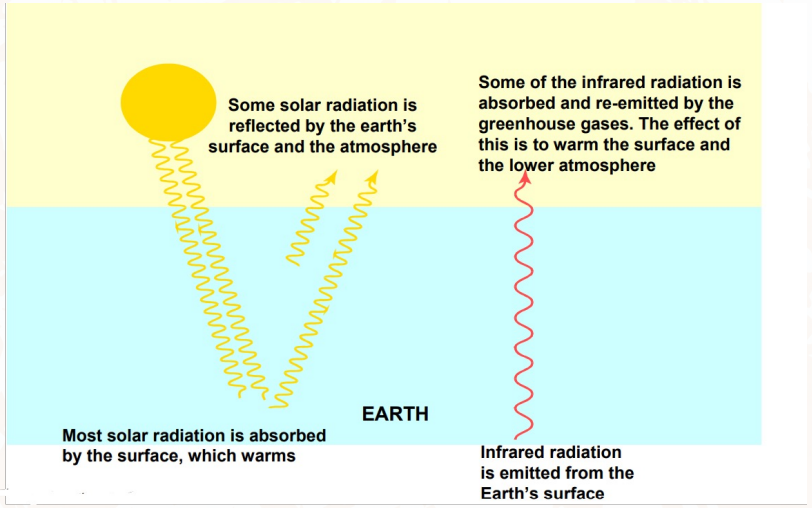


Earth's annual and global mean energy balance

Greenhouse Effect

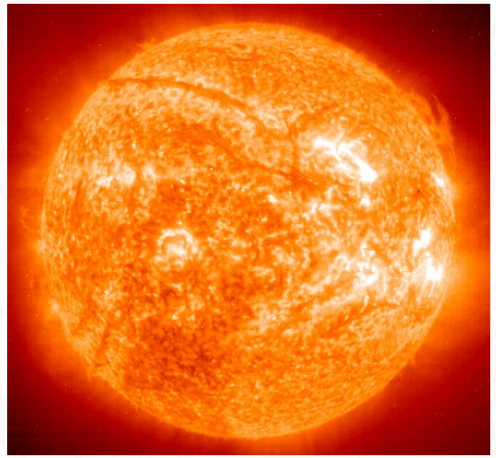
- The atmosphere is quite transmissive to visible light (incoming energy)
- But thermal infrared is greatly absorbed mainly H2O; CO2 and CH4 and others
- They effectively absorb 75% of the IR and re-emit it down again. It's the greenhouse effect

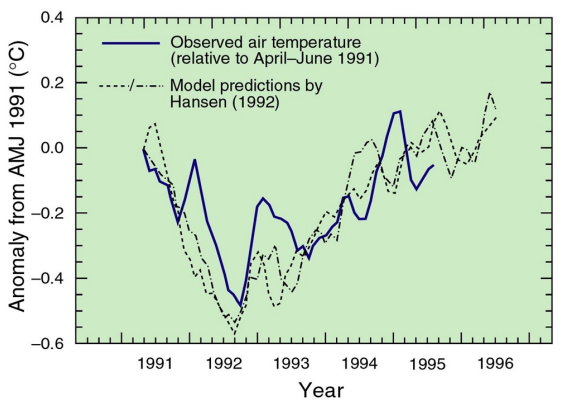




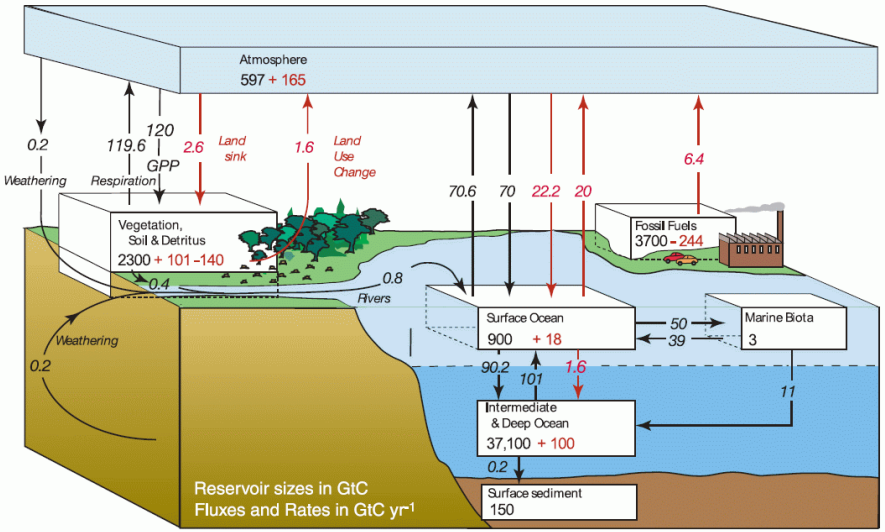
Concept of radiative forcing

- **Changes in certain components of the climate system perturb** the radiative **energy budget of the system**, (i.e. provide a radiative forcing):
- Nature-induced perturbations
- Human-induced perturbations





The effect of the Mt. Pinatubo eruption (June 1991) on global temperature



Land-use change (agriculture, deforestation, reforestation, afforestation, urbanization, traffic, …)

Perturbations of the atmospheric composition with GHG + aerosols

What is warming our world?

Changes in certain components of the climate system perturb the radiative energy budget of the system, (i.e. provide a radiative forcing):

- Nature-induced perturbations
- Human-induced perturbations

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What is the impacts of this warming on climate stressors/risks in Africa?

Brief introduction to IPCC AR6 findings

Expected change in Africa

Key
High confidence of decrease
Medium confidence of decrease
Low confidence in direction of change
Medium confidence of increase
High confidence of increase
Not broadly relevant

Region	Heat and Cold				Wet and Dry								Wind				Snow and Ice		Coastal & Oceanic					Other		
	Mean air temperature	Extreme heat	Cold spell	Frost	Mean precipitation	River flood	Heavy precipitation and pluvial flood	Landslide	Aridity	Hydrological drought	Agricultural and ecological drought	Fire weather	Mean wind speed	Severe wind storm	Tropical cyclone	Sand and dust storm	Snow, glacier and ice sheet	Hail	Relative sea level	Coastal flood	Coastal erosion	Marine heatwave	Ocean acidity	Air pollution weather	Atmospheric CO_2 at surface	Radiation at surface
North Africa (MED)*	●	●	●		○									3					○		4		○		●	
Sahara (SAH)	●	●	●																○		4		○		●	
Western Africa (WAF)	●	●	●		1				1	1	1								○		4		○		●	
Central Africa (CAF)	●	●	●																○		4		○		●	
North Eastern Africa (NEAF)	●	●	●		1,2				1	1	1								○		4		○		●	
South Eastern Africa (SEAF)	●	●	●		1				1	1	1				3				○		4		○		●	
West Southern Africa (WSAF)	●	●	●		○														○		4		○		●	
East Southern Africa (WSAF)	●	●	●		○										3				○		4,5		○		●	
Madagascar (MDG)	●	●	●												3				○		4,5		○		●	

Summary of confidence in direction of projected change in climatic impact-drivers in Africa, representing their aggregate characteristic changes for mid-century for medium emission scenarios RCP4.5, SSP3–4.5, SRES A1B, or higher emissions scenarios (e.g., RCP8.5, SSP5–RCP8.5), within each AR6 WGI region (inset map) approximately corresponding to global warming levels between 2°C and 2.4°C
1. Contrasted regional signal: drying in western portions and wettening in eastern portions 2. Likely increase over the Ethiopian Highlands 3. Medium confidence of decrease in frequency and increase in intensity 4. Along sandy coasts and in the absence of additional sediment sinks/sources or any physical barriers to shoreline retreat. 5. Substantial parts of the ESAF and MDG coasts are projected to prograde if present-day ambient shoreline change rates continue

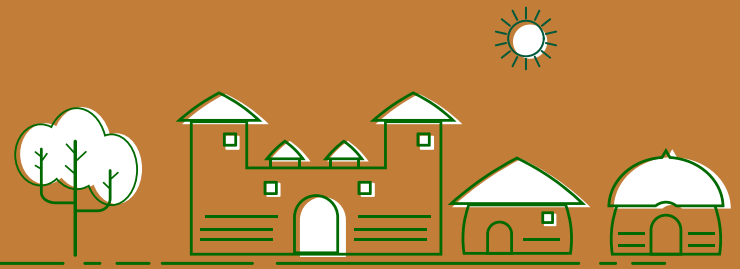
- ● Already emerged in the historical period (medium to high confidence)
- ○ Emerging by 2050 at least in Scenarios RCP8.5/SSP5-8.5 (medium to high confidence)
- ○ Emerging after 2050 and by 2100 at least in Scenarios RCP8.5/SSP5-8.5 (medium to high confidence)

Climate risk can be classified considering

- Intensity/Amplitude
- Occurrence/Frequency/Likelihood

Terminology	Probability	Level of confidence
Virtually certain	99–100%	Very high
Very likely	90–100%	
Likely	66–100%	High
About as likely as not	33–66%	Medium
Unlikely	0–33%	Low
Very unlikely	0–10%	Very Low
Exceptionally unlikely	0–1%	

Understanding climate analysis: historical and projection of future climate under various scenarios and time horizons?



1. Analysis of historical climate data (30 years)
   - Nat Met Service Data, CRU (Climate Research Unit) data
   - Key climate parameters: Precipitation, Min & Min Temp.
   - Seasonal features, trend analysis, climate indices

2. Future climate data
   - Global Climate Model (GCM), Regional Climate Models (RCM) (CORDEX Coordinated Regional Downscaling Experiment)

- Key climate parameters: Precipitation, Min & Min Temp.
- Assess the performance of the climate models using observed data aligned with the historical period of the model (1976 - 2005)

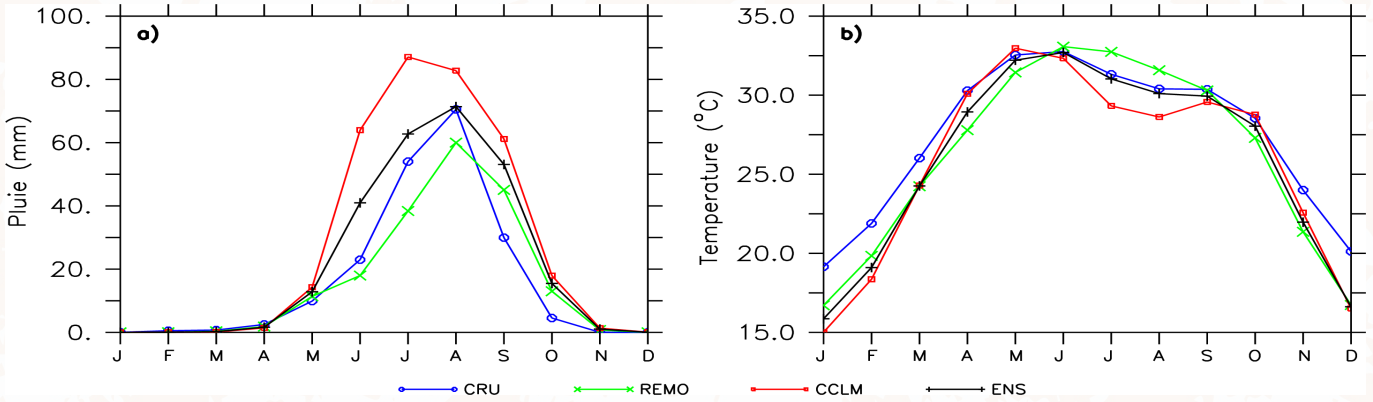


Figure 1: Annual rainfall cycle (a) and mean temperature (b) from CRU, de models REMO, CCLM and the REMO CCLM ensemble mean.

3. Assessing the change in future climate projected in climate indices

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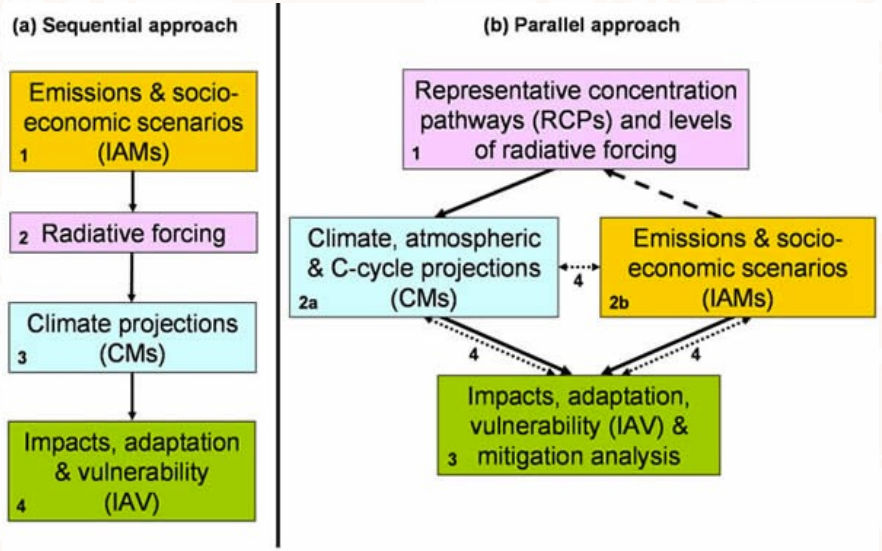
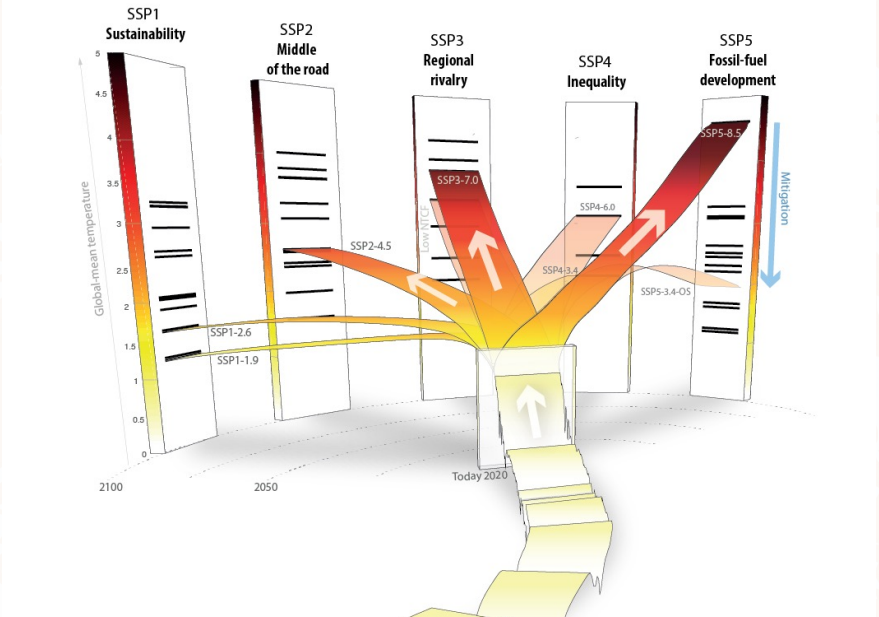
- New release climate model data IPCC AR6
- CMIP 6 Models

	Historical	SSP1-1.9	SSP1-2.6	SSP2-4.5	SSP3-7.0	SSP4-6.0	SSP5-8.5
Numbers of CMIP 6 Model	27	8	26	27	22	5	27

Climate Scenarios

- SSP 1: Sustainability - Taking the green road (low challenges to mitigation and adaptation)
- SSP 2: Middle of the road (moderate challenges to mitigation and to adaptation)
- SSP 3: Regional rivalry - A rocky road
- (moderate challenges to mitigation and to adaptation)
- SSP 4: Inequality - A road divided
- (low challenges to mitigation and high challenges to adaptation)
- SSP 5: Fossil-fueled development - Taking the highway
- (high challenges to mitigation and low challenges to adaptation





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Assessing and integrating climate risks?

1. Some Useful Indices for Climate Risk Assessment

ID	Indicator name	Definitions	Units
GSL	Growing season Length	(1st Jan to 31st Dec in NH, 1st July to 30th June in SH) count between first span of at least 6 days with TG>5ºC and first span after July 1 (January 1 in SH) of 6 days with TG<5ºC	Days
TN90p	Warm nights	Percentage of days when TN>90th percentile	Days
TX90p	Warm days	Percentage of days when TX>90th percentile	Days
R95p	Very wet days	Annual total PRCP when RR>95th percentile	Mm
Rx5day	Max 5-day	precipitation amount Monthly maximum consecutive 5-day precipitation	Mm

2. Advanced approaches for assessing climate Risk Assessment

▷ E.g Coupling Climate and Impact Assessment model (such as crop models for assessing onset or GDL)

Experience sharing – Storytelling

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Discussion session

Please relate your country's experience encountering challenges in providing a scientific basis for a project climate rationale - Focus on the key challenges.

Any experience in the demonstration of climate rationale in the case of a multi-country project?

What were the specific challenges?

What AAI can put in place to overcome these challenges related to the climate rational

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Thank You

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Africa Adaptation Initiative South-South peer capacity Exchange Programme: Fundamentals of Climate Finance

5 October 2022 , Rabat, Morocco

by Anna Katsantonis

Mentimeter

1. What does the term 'Climate Finance’ means for you?
2. What % of global climate investments are going to Adaptation?
3. What % of climate investments are coming from the private sector?

Please join the Mentimeter:

- Option 1 - use your cell phone camera to focus on the QR code
- Option 2 – in your browser insert Mentimeter.com and insert code

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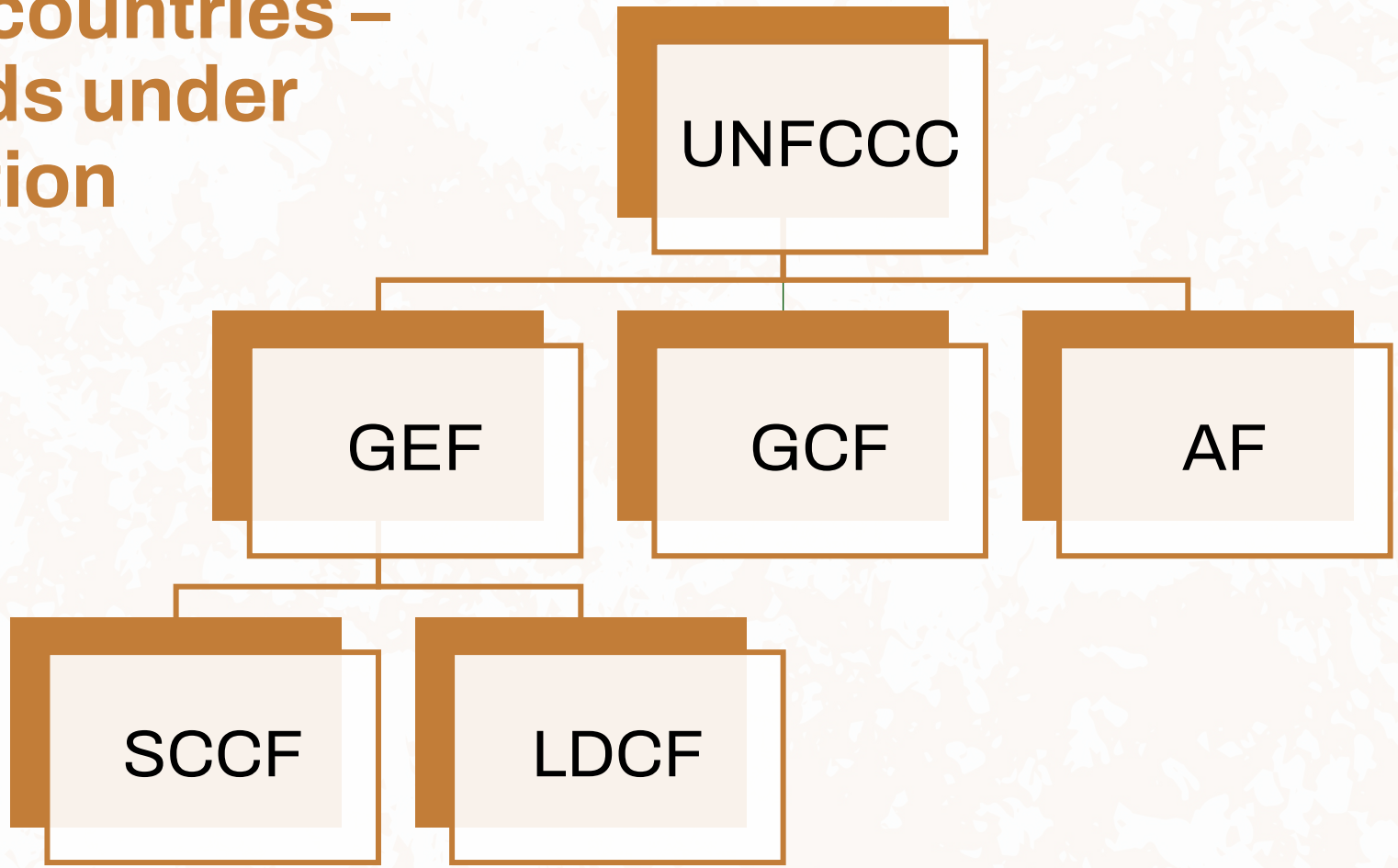
Climate Finance architecture

Part 1

Climate finance in developing countries – Climate funds under the Convention



Landscape of Climate Finance in Africa Sep ‘22

https://www.climatepolicyinitiative.org/

Climate finance gap in Africa and private sector funding of adaptation

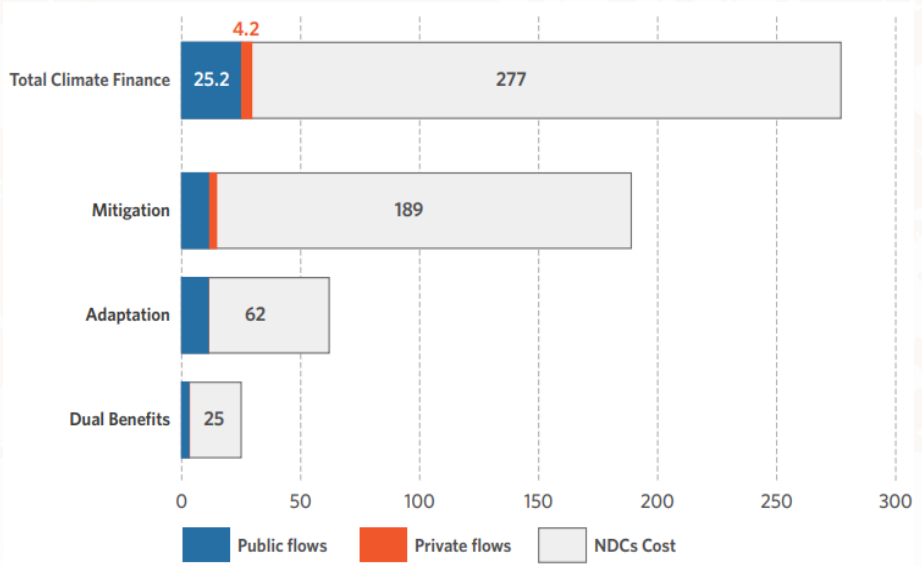


Figure 1 - Private and public climate finance flows vs. total cost by climate use (USD billion)

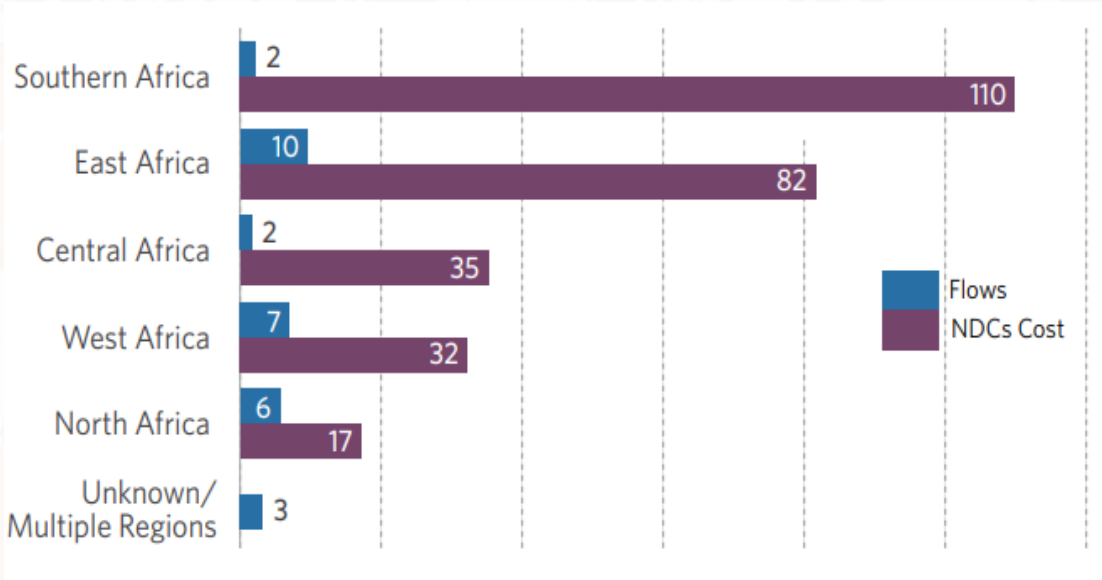
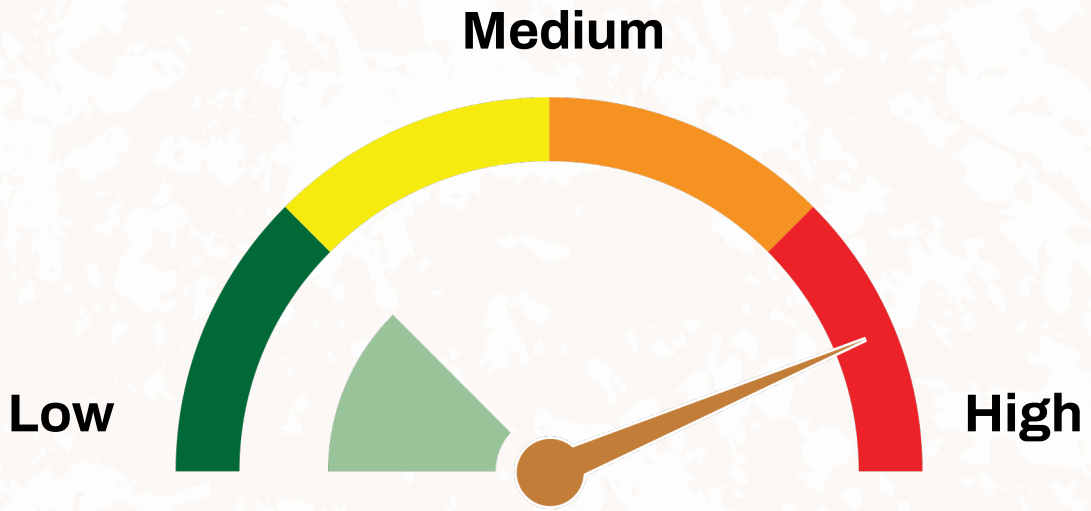


Figure 2 - Climate finance flows and needs in Africa (USD billion, annual average)

Risks reducing investors' appetite:

- Currency volatility
- Regulatory and governance problems
- Lack of bankable project pipelines
- Counterparty risks
- Lack of technical capacity, transparency, and accountability mechanisms
- Information asymmetries



Solutions:

1. Adapt finance strategies to address current and future country realities
2. Catalyze private finance, including domestic capital
3. Data tracking and disclosure to inform financing strategies
4. Enhance the enabling environment through capacity building
5. Facilitate climate investment at a sub-national level

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Part 2

Typology of climate finance providers and range of available financial instruments

Landscape of Climate Finance in Africa Sep '22

https://www.climatepolicyinitiative.org/

Climate finance providers

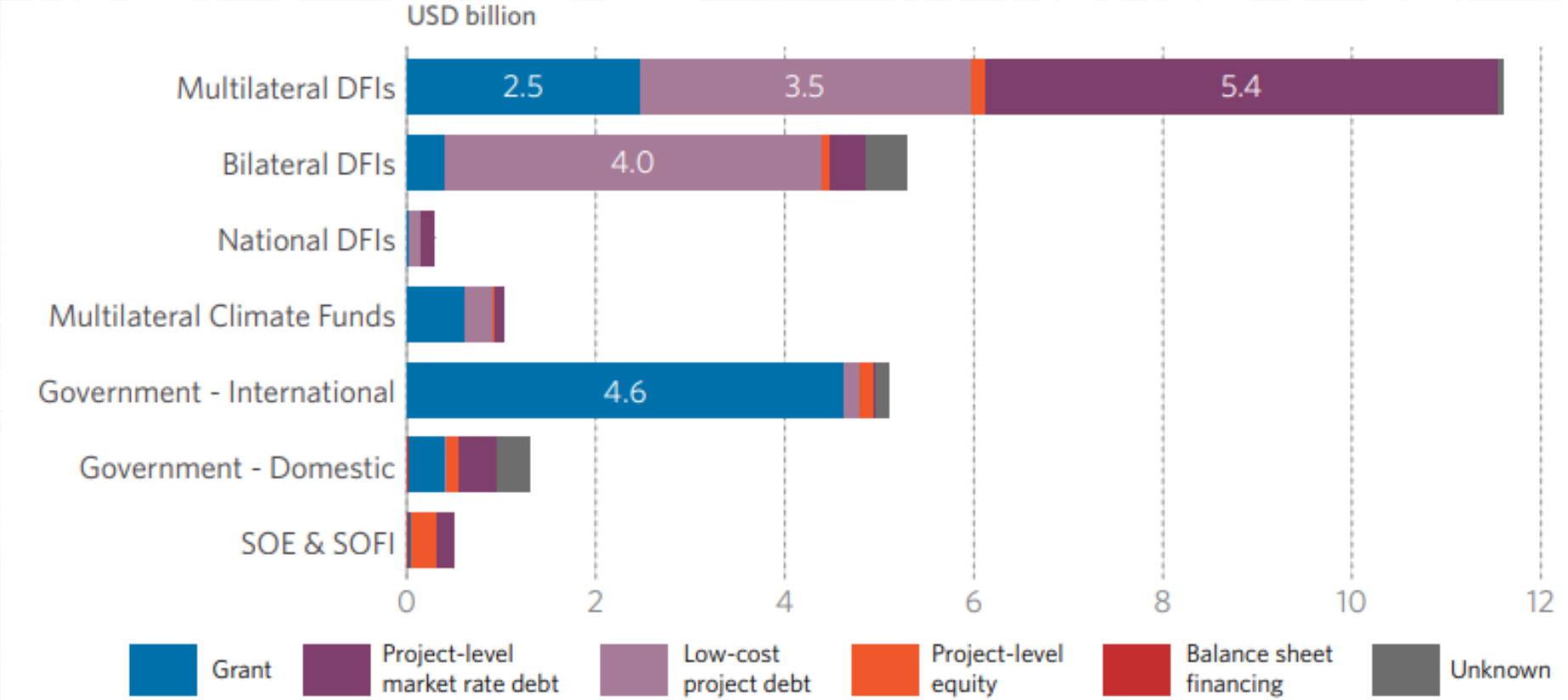


Figure 3 - International public climate finance by public actors and instruments (2019/2020 average, USD billion)

Financial instruments for climate change

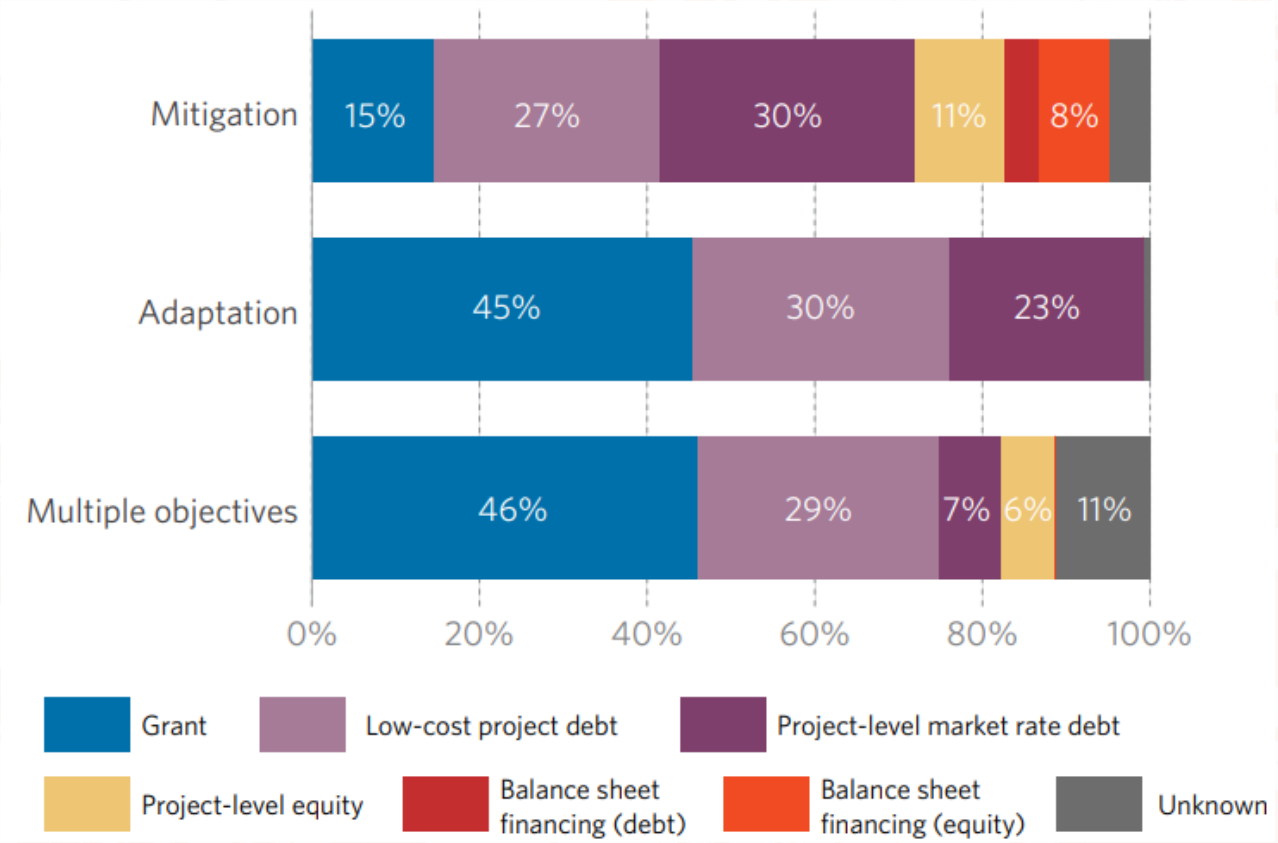


Figure 4 - Climate finance by thematic use and instruments (2019/2020 average, USD billion)

Loans (56%) were the preferred instruments for climate finance in Africa, followed by grants (30%):

- Mitigation: loans (57%)
- Adaptation: grants (46%) and low-cost loans (30%)
- Adaptation in low-income countries: grants (69%)
- Adaptation in lower-middle-income countries: loans (73%)
- Commercially attractive sectors (e.g., energy): loans (56%)
- Agriculture, forestry, and other land use (AFOLU): grants (54%)

Benefits of the core Financial instruments for climate Investments

Grant

- No obligations
- Simple T&C

Equity

- High returns potential
- Provides access
- Flexibility for CF

Loan

- Tax deductible
- Easier to refinance

Guarantee

- Catalyzing effect
- Collateral easement

Concessionality

	WHAT TO CONSIDER	HOW TO DETERMINE THE LEVEL OF CONCESSIONALITY
CHOICE OF FINANCIAL INSTRUMENT	▷ Grant ▷ Reimbursable grant ▷ Loan ▷ Guarantee ▷ Equity	▷ Financial analysis ▷ Economic analysis ▷ Strategic context
ESTABLISHEMENT OF CONDITIONS	▷ Interest rate ▷ Tenor ▷ Grace period ▷ Local currency ▷ Other, including disbursement-related conditions and covenants	▷ Qualitative and quantitative analysis ▷ Maket overview ▷ Technical, risk of financial assement

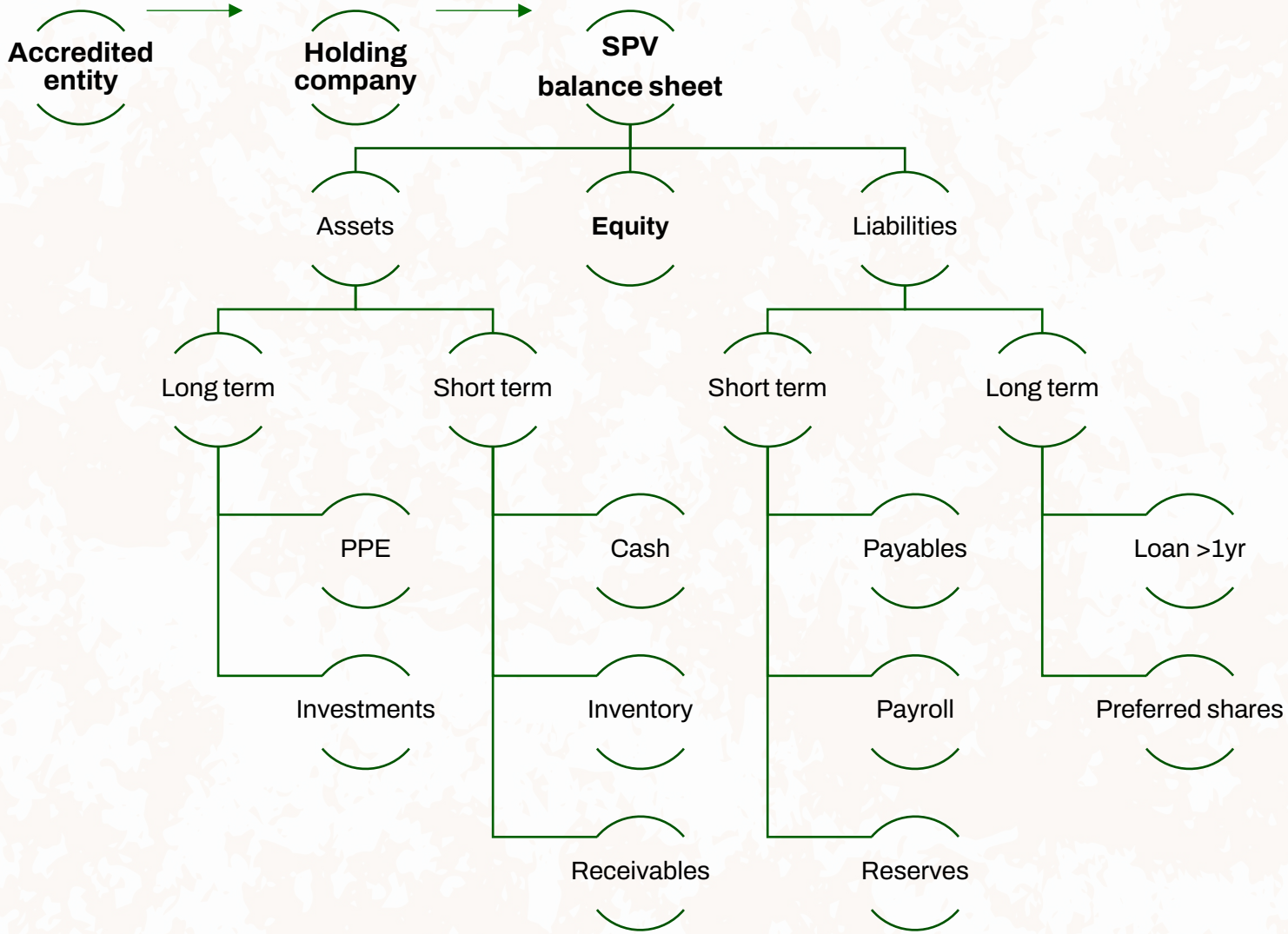
Concessional lending is used when financing at market terms is not available or would make the investment unviable. In the absence of concessional funds, the resulting cost increase might create pressure on fiscal subsidies, burden consumers if additional costs are passed on to them via prices or tariffs, or make projects or programmes unviable.

GCF Financial terms and conditions of grants and concessional loans, adopted by the Board and contained in annex II to decision B.09/04, paragraph (b)

Table 2: Terms and conditions of outgoing concessional loans to the public sector

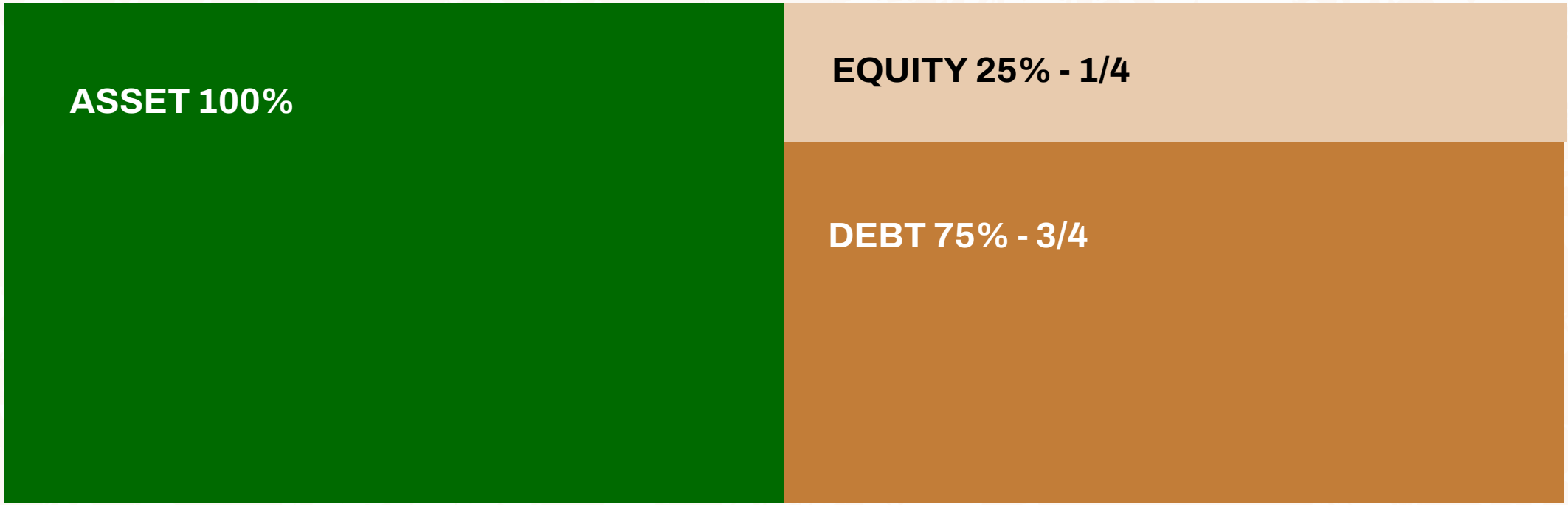
	Currency	Maturity (years)	Grace period (years)	Annual principal repayment years 11–20/6–20 (% of initial principal)	Annual principal repayment years 21–40 (% of initial principal)	Interest	Service fee (per annum)	Commitment fee (per annum)
High concessionality	Major convertible currency	40	10	2%	4%	0.00%	0.25%	Up to 0.50%
Low concessionality	Major convertible currency	20	5	6.7%	NA	0.75%	0.50%	Up to 0.75%

Equity in a project company



Equity component

Assets = Capital
Assets = Equity + Debt
Solvency ratios



Risk transfer by Financial instruments

Example of concessionality in practice from recently approved projects

First loss Junior equity
FP181
Fund for Adaptation Technologies

Subbordinated loan
FP189
E-mobility in India

Grant
FP188
Fishery Initiative

Reimbursable grant
FP190
Water infrastructure

Guarantee
FP179
Smart agriculture

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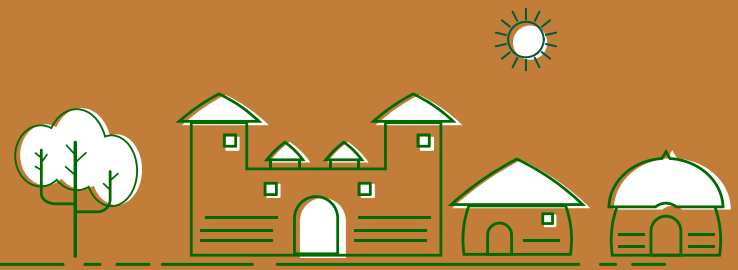
Structuring climate investments for bankability [choices of the right instruments]

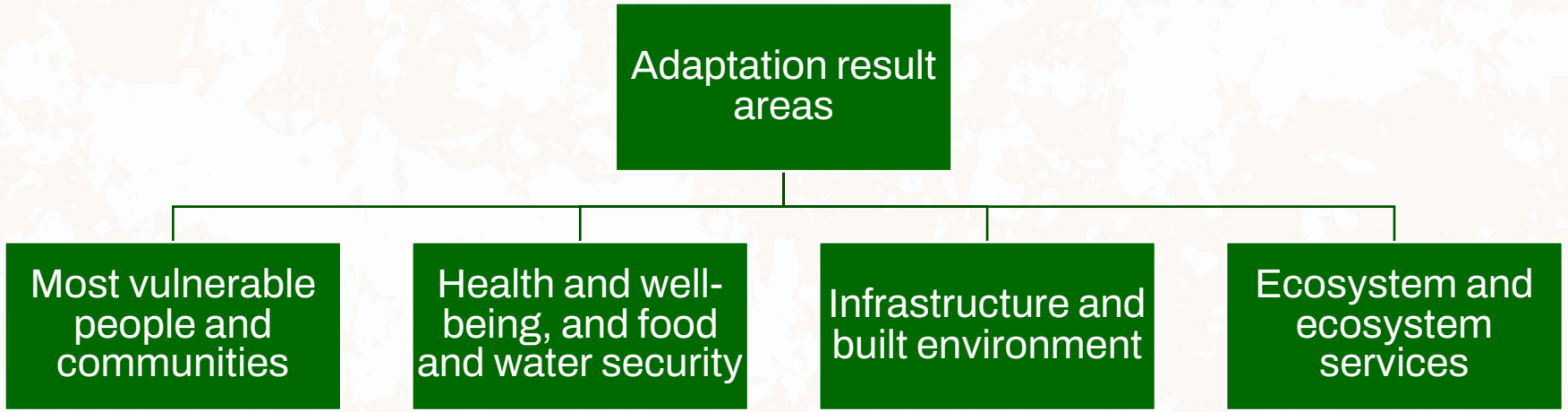
Part 3



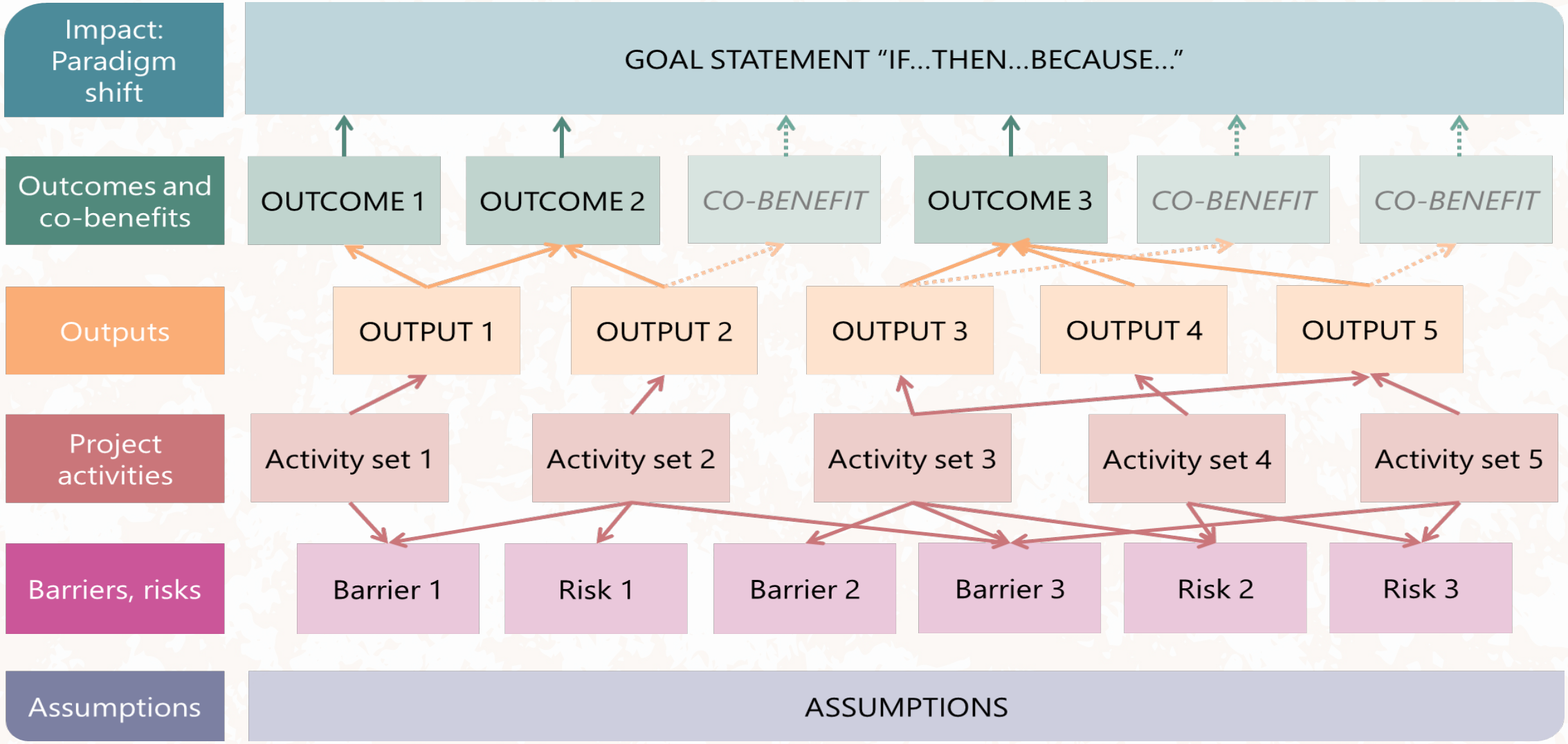
Result areas for GCF adaptation programmes

GCF Appraisal Guidelines:

Project proposals should describe the expected reduction in loss of lives, maintenance of the value of physical assets, livelihoods, and/or reductions in environmental or social losses otherwise arising from the impact of extreme climate-related disasters and climate change in the geographical area of the GCF intervention. Proposals should also refer to the number of direct and indirect beneficiaries of the project, taking into account the needs of developing countries that are particularly vulnerable to the adverse effects of climate change.



Theory of change for GCF programmes



Additional drivers for investment instruments choice:

1. Accredited entity mandate
2. Nature of the programme activities and potential for reflows
3. Sector best practices

Exemples of grant adaptation and cross-cutting programmes with public sector

Exemples of non-grant cross-cutting programmes

This programme is an on-lending programme providing credit lines to local commercial banks. These loans will exclusively target micro, small, and medium-sized enterprises (MSMEs) and farmer-based associations led by women to support low-emissions and climate-resilient agricultural practices.

The Secretariat, in consultation with the Accredited Entity and National Designated Authority, will present to the Board options regarding increasing the grant portion of GCF funding to the benefit of the most vulnerable women.

Financial structuring requirements

assessment of the soundness of the financial structure including the choice of financial instruments, justification for the GCF funding amount, co-financing, pricing, and subordination, and includes any factor or scenario stress testing:

- review of soundness
- economic and financial analysis
- relevance and effectiveness
- financial and investment risk assessment
- financial barriers and Innovation
- Additional tools and indicators (ratio of co-financing, rate of return, grant equivalent, concessionality)

Takeaways

- Choice of Financial instruments is crucial at the early stage
- Financial structuring must be planned proactively
- Equity and subordinated loan are feasible alternatives to grant for adaptation investments

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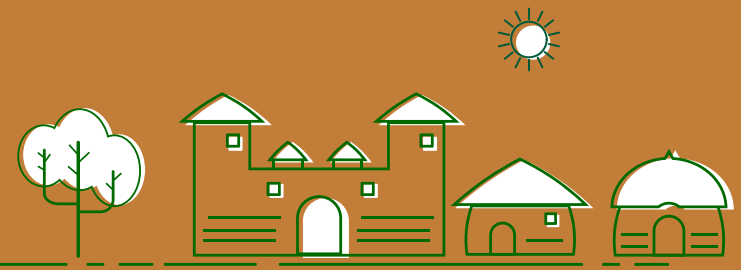
Discussion

1. Suggest appropriate financial instrument
2. South South exchange with peers



Part 4

Suggest suitable financial instrument

1. Building capacity and institutions for the improved implementation of devolution is seen as necessary to enhance the climate resilience of arid and semi-arid lands. Interventions focus on increasing the adaptive capacities of communities and local institutions to develop evidence-based landscape planning. This will be done by increasing accessibility to climate data and information; and enhancing the ability of community-based cottage industries to access markets and financial services.
2. The project incentivizes the participation of the private sector by engaging with commercial banks and microfinance institutions. It will provide much desired financial support to smallholder farmers by increasing access to credit in tandem with technical assistance and capacity building.
3. GCF programme creates an Investment Window through a fund to encourage investments in the blue economy.

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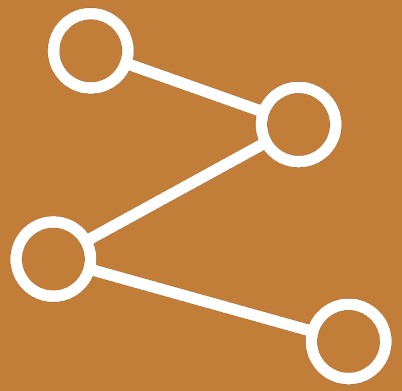
Case study: Climate proposal development cycle

5 October 2022 Rabat, Morocco

by Sandra Freitas, CEO of SSA

Agenda



1. GCF appraisal framework
2. Case study

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GCF appraisal framework

Part 1

GCF appraisal areas

https://www.greenclimate.fund/document/appraisal-guidance

1. **Climate impact**
2. **Additionality**
3. **Innovation**
4. **Scalability**
5. **Sustainability**
6. **Financial Structuring**
7. **Concessionality**
8. **Development of co-benefits**
9. **Risk and Compliance**
10. **Technical Soundness**

Appraisal areas for review stages

- Climate impact
- Additionality
- Innovation
- Scalability
- Sustainability
- Concessionality
- Financial structuring
- Co-benefits
- Risks and compliance
- Technical soundness

Step1 - Receipt of CN

Step2 - Review for CIC2

FP for CIC3

CONCEPT NOTE

The following elements do not need to be provided at the CN stage:

- IRMF indicators and results levels;
- Detailed budget;
- Project appraisal report.

The CN to GCF should provide the following information:	A brief climate context and baseline;
	A project description, including project components;
	The project size, suggested financial instruments and other financial information;
	Brief information on how the concept note meets the GCF investment criteria; and
	Information on engagement with the NDA(s) and relevant stakeholders.
Optional annexes to be included at the CN stage:	Map indicating the location of the project/programme;
	Diagram of the theory of change;
	Economic and financial model with key assumptions;
	Pre-feasibility study, if applicable;
	Evaluation report of previous project(s), if any;
	Results of E&S risk screening.

Vital role of NDAs for CN endorsement

AEs should seek to engage with NDAs/focal points as part of the CN/funding proposal preparation process through the following steps:

1. Inform the NDA/focal point about the activity proposed to be implemented in their country;
2. Commence consultations with a view to confirming whether the proposed activity is in accordance with the country's strategic framework and priorities, including its **country programme, nationally determined contribution, national adaptation plan** or other relevant climate change strategies and plans; and
3. Notify the Secretariat that it has commenced consultation with the NDA/focal point via the relevant provisions of the CN.

Concept Note – guiding questions

Receipt of CN

- Does the concept note contribute to **low-emission and climate-resilient** development pathways?
- Is the ToC / programme description rooted in **climate risk and vulnerability**?
- Does the intervention address the **climate impact**?

CN review for CIC2

- Is GCF Intervention essential for the programme **viability**?
- Does it address financial and non-financial **barriers**?
- Will it contribute to a **paradigm shift** in the sector?

Project Preparation Facility support

- 1 - Pre-feasibility and feasibility studies, as well as project design

- 2 - Environmental, social and gender assessments and management/action plans

- 3 - Risk assessment

- 4 - Identification of project-/programme-level indicators

- 5 - Pre-contract services, including the revision of tender documents

- 6 - Advisory services and/or other services to financially structure a proposed activity, including any legal, regulatory and other due diligence required to be conducted by the AE

- 7 - Other project preparation activities, where necessary, provided that sufficient justification is available, such as the conduct of stakeholder consultations and obtaining free, prior and informed consent for proposals that are required to meet the requirements of the GCF Indigenous Peoples Policy and environmental and social safeguards on Indigenous peoples

Check point 1

1. what is the role of a CN and in which special cases it is recommended?
2. In which cases can CN be rejected by GCF?
3. Why environmental and social risk category is important for CN?

Concept note at CIC2

Task team review for CIC2:

- CN against the requirements of Innovation and Additionality and, optionally, against the Investment Criteria
- Proposal's impact potential, based on a climate assessment by Climate Specialists
- Country ownership

Additional consideration by CIC2

- alignment with the Strategic Plan, policies, GCF portfolio-level goals and Board decisions on financial planning

1. Climate impact

Mitigation impact indicator: project lifetime emission reductions (in tonnes of carbon dioxide equivalent). Project proposals should describe the expected reductions in emissions resulting from the GCF intervention.

Adaptation impact indicator: Project proposals should describe the expected change in loss of lives, value of physical assets, livelihoods, and/or environmental or social losses due to the impact of extreme climate-related disasters and climate change in the geographical area of the GCF intervention. Proposals should also refer to the number of direct and indirect beneficiaries of the project, taking into account the needs of developing countries that are particularly vulnerable to the adverse effects of climate change

To be supported by

- For mitigation, external references on appropriate methodologies for GHG calculations
- For adaptation, external references on credible models and databases for climate information
- Consideration (provision) for monitoring and evaluation of the estimated impact

2. ADDITIONALITY

Proof that the interventions would not occur without the funding Provided through GCF

This requires a clear identification of barriers, both financial and non-financial, that prevent the interventions from being implemented, and the alternatives to the intervention that would potentially achieve the same climate impact, illustrating thereby the rationale for the proposed intervention to be preferred.

Governing Instrument, par 54: “Financing will be tailored to cover the identifiable additional costs of the investment necessary to make the project viable”

To be supported by

- Justification for GCF investment need
- Assessment of financial and non-financial barrier analyses and financial models risks relevant to addressing these barriers

3. INNOVATION

Whether new technical or business innovations, governance, legislative or planning systems will be created and/or adopted through the proposed intervention to address mitigation and/or adaptation needs, or whether the proposal describes the scaling up, adaptation or replication of existing tools, systems or approaches in ways that are specifically prompted by the climate context and the needs of the countries.

To be supported by:

- Innovation link to climate rationale
- Presence of innovative components in the proposal, and justification for claims to innovation
- Innovative nature of the interventions; assess viability and sustainability of the innovation, from technical, institutional and financial perspectives

4. SCALABILITY

- Scalability is a potential for expanding the scale and impact of the proposed programme or project. This must be supported by a strong theory of change as well as evidence of the existence of market demand for the sector targeted for scaling up, with reference to existing studies, surveys and literature, both within and outside the project or programme target locations and communities where the same climate rationale applies.
- Inherent in the assessment of scalability is the replicability of the interventions supported through the project or programme, considering the complexity of the interventions and the technical capacities required to replicate them and supporting infrastructure e.g. extension, service and monitoring. It will also consider the economies of scale involved in expanding the scope and impact of the interventions, assessing to what extent the unit costs may be reduced, the implications for employment, business opportunities and livelihood benefits improved, as the extent increases.

To be supported by

- Information related to scalability contained within the CN/FP package
- Potential for application of project or programme approaches in the target countries beyond the specified geographical or thematic scope, or in other country contexts

5. SUSTAINABILITY

This appraisal area is an assessment of the sustainability of outcomes and results beyond the completion of the intervention. Reviews of this appraisal area will focus on the details of the funding proposal that provide evidence and confidence for the long-term continuation of relevant outcomes and, as necessary, key relevant activities initiated through the project or programme, beyond the implementation period and the project or programme lifetime.

To be supported by:

- Exit strategy, sensitivity analyses
- Review of economic and financial analysis
- EWP and CP development and alignment; EE capacity and institutional analysis

6. Concessionality

Concessionality is the minimum amount necessary to make a proposal viable and help to achieve the climate impact and paradigm shift objectives of the GCF.

Concessionality is required when the economic benefits to the public of mitigation and adaptation interventions are under-priced in investment decisions, due to financial or non-financial barriers. GCF offers concessionality, funding with below-market terms and conditions.

To be supported by:

- Financial structure of the project or programme; economic and financial analysis;
- Calculations and rationale underpinning the funding request

7. Financial structuring

- This area should demonstrate soundness of the financial structure including the choice of financial instruments, justification for the amount of GCF funding, co-financing, pricing, and subordination, and includes any factor or scenario stress testing that is required.
- The assessment of the structure shall take account of the context (including country context) of the proposed projects and programmes (including the selection criteria and selection process for sub-projects), as well as the source and type of co-financing, and the potential for leveraged finance. A sound financial structure can strengthen the viability of the project while adhering to the principle of minimum concessionality.

To be supported by:

- Financial structure of the project or programme; economic and financial analysis
- Relevance and effectiveness of proposed financial instruments

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Case study

please suggest project idea to start the discussion

Part 2

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Thank you

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