Mainstreaming Climate Information and Services into Legislation, Development Policies, Plans and Practices

TRAINING RESOURCES FOR CAPACITY BUILDING FOR LEGISLATORS, POLICY MAKERS AND CIVIL SOCIETY

-
- WORKSHOP PROCCEEDINGS REPORT
-
- HELD IN ADDIS ABABA

- 20th – 22nd October 2016
- Facilitator: Camco Advisory Services

Structure of the Presentation

1. Definition of Terms & Guide to the Toolkit on CI/S
2. Introduction to Climate Information Services
3. Types of Climate Information
4. Climate Services and Products
5. Climate Information Services
6. Climate Information and Services Legislation
7. Mainstreaming Climate Information and Services into Laws, Plans and Policies

About Camco Advisory Services

Part of Camco Clean Energy Plc UK and a leading climate change and sustainable development company.

- 27 year legacy and extensive experience throughout Africa
- Camco Africa office located in Nairobi
- Camco also has an extensive network of regional partners in Rwanda, Ethiopia, Zambia, Uganda and Mozambique among others

Energy Business Awards ASIA 2007 Silver Award Environmental Markets
Environmental Finance AWARDS 2007
Energy Business Awards ASIA 2008 Gold Award Environmental Markets
Top 30 offset provider as featured in ENDS 2008
CO2 Carbon Market AWARDS 2007 - 2008 - 2009
Environmental Finance AWARDS 2009

Camco Business Model

Climate Policy & Planning

Rural Energy and Development Services

Green Growth and Urban Devt

Project and Carbon Development

Examples of Work Recently Undertaken

Policy and Planning

- Planning for Resilience in East Africa through Policy, Adaptation, Research and Economic Development (PREPARED) – (USAID)
- Kenya Climate Change Expenditure Budget Review
- Kenya's Climate Change Response Strategy (NCCRS)
- Kenya Climate Change Expenditure Budget Review

Rural Energy and Development Services

GAP Fund Management

UNDP: Developing Sustainable Charcoal (EA, Ethiopia, Angola)

Africa Renewable Energy Advisory Services

Green Growth & Urban Devt

- Building Capacity for Green Growth and Climate Change Adaptation (AfDB)
- Green Points – Natural Resources Management project

Project and Carbon Development

- Mau Forest Carbon Assessment
- Nepal REDD Readiness preparation program
- CDM capacity Building in Uganda

Definition of common terms

- Weather is the day to day variations in the climate parameter.
- Climate is the average weather conditions (taken over a period not less than 30 years), including seasonal to inter-annual extremes and variations locally, regionally and across the globe.
- Climate variability is the year to year fluctuation or the variation in mean state of climate on all spatial and temporal scales.
- Climate Change refers to a change in the state of the climate that persists for an extended period, typically 3 decades (30 yrs) or longer. Climate change may be due to natural and anthropogenic processes.

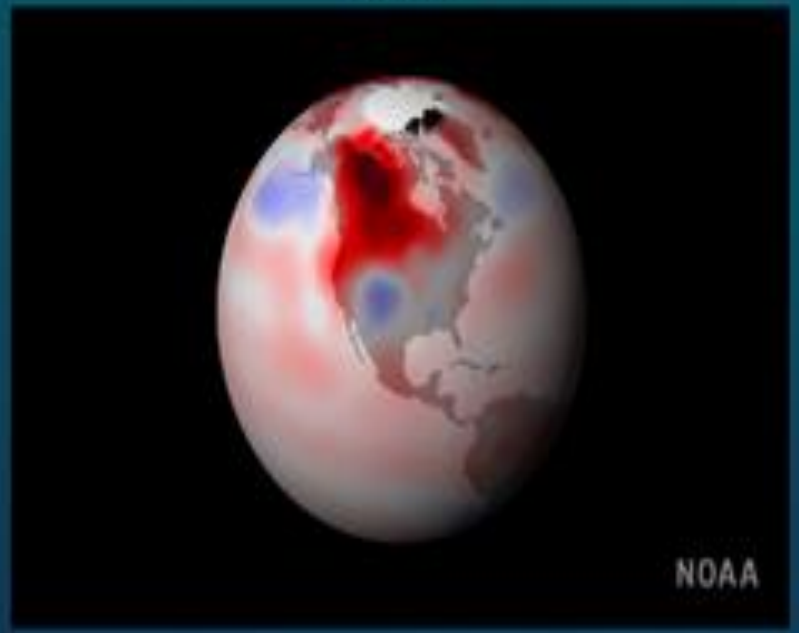
Weather

DAILY FORECAST

SUN MON TUES WED THUR FRI SAT

We can forecast daily **weather** with confidence up to only 7-10 **days** in advance.

Climate



We can estimate **climate** with some confidence over many **decades**.

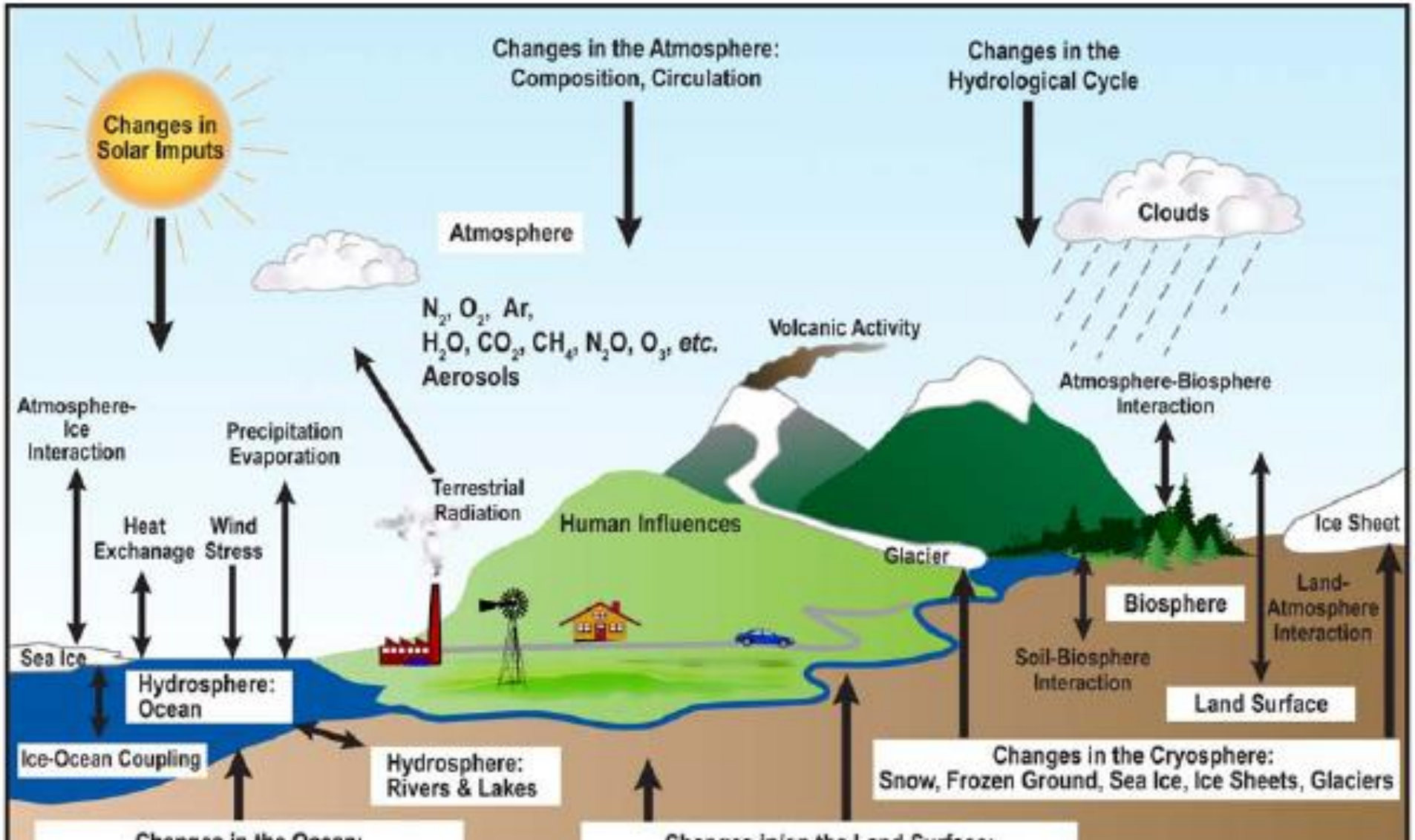
Climate and the Climate System?

- The climate system is a complex, interactive system consisting of components:

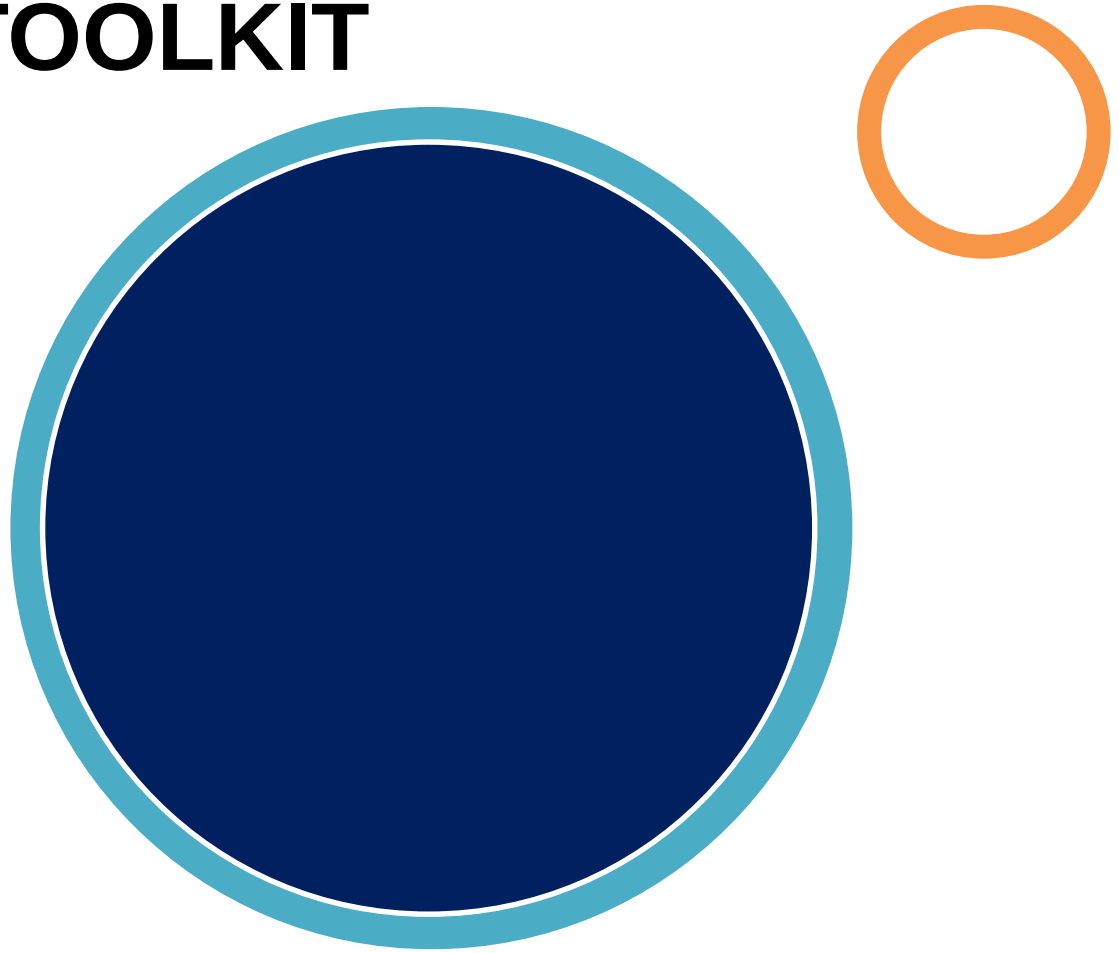
Component	Response Time
1. Atmosphere (gases, liquids, solids)	τ ~1 month
2. Ocean (shallow and deep layers)	τ~months to years (shallow layers) τ ~Centuries (deep layers)
3. Cryosphere (ice and snow cover)	Days to centuries
4. Land structure (land, and hydrologic cycles)	Long term
5. Biosphere/biomass (human activities, animals, plants)	Short to long-term

Climate components

Land & Atmosphere: The Climate System most influenced by Humans



PART 1: INTRODUCTION TO THE GUIDE/TOOLKIT



What is the Purpose of this Toolkit?

- This toolkit promotes the use of **Climate Information/ Climate Information Services** in **development policies, planning and practice** in Africa.
- Its aim is to build the **capacity of decision makers and experts, develop and implement national strategies** to mainstream Climate information Services into decision making.

What are the Contents of the Guide?

Overview of Climate Information/ Services	Explains what Climate Information/ Climate Information Services are and their uses in planning and decision making
	Explains the physical structure of Climate Information/ Climate Information Services
	Describes the global context of Climate Information/ Climate Information Services
	Describes Climate Information & Climate Information Services available for decision makers
	Analyses the state of Climate Information/Climate Information Services in Africa and;
	Makes recommendations on how strengthen Climate Information/ Climate Information Services in Africa

Who is the Intended Audience?

To build the capacities of policy makers in **Key decision L**egislatures:

- **All sectors of government development policy making**, and **in Regional Economic Communities**
- **Regional bodies**.
- **Decision makers in municipalities** and other **sub-national authorities**.

Why is Climate Information Necessary for Decision Makers?

- Africa is highly vulnerable to climate change, esp. in water, agriculture, forestry, and coastal development sectors.
  - Economies are largely directly dependent on natural resources, hence vulnerable to Climate Change
  - Many development processes, policies and decisions are affected by weather and climate every year
  - Livelihoods of the majority of the continent's population are sensitive to climate-related shocks, including drought and flooding.

Why is Climate Information Necessary for Decision Makers?

- **Better decision making:** Necessary in helping decision makers & communities make informed decisions that factor in Climate Change & extreme weather

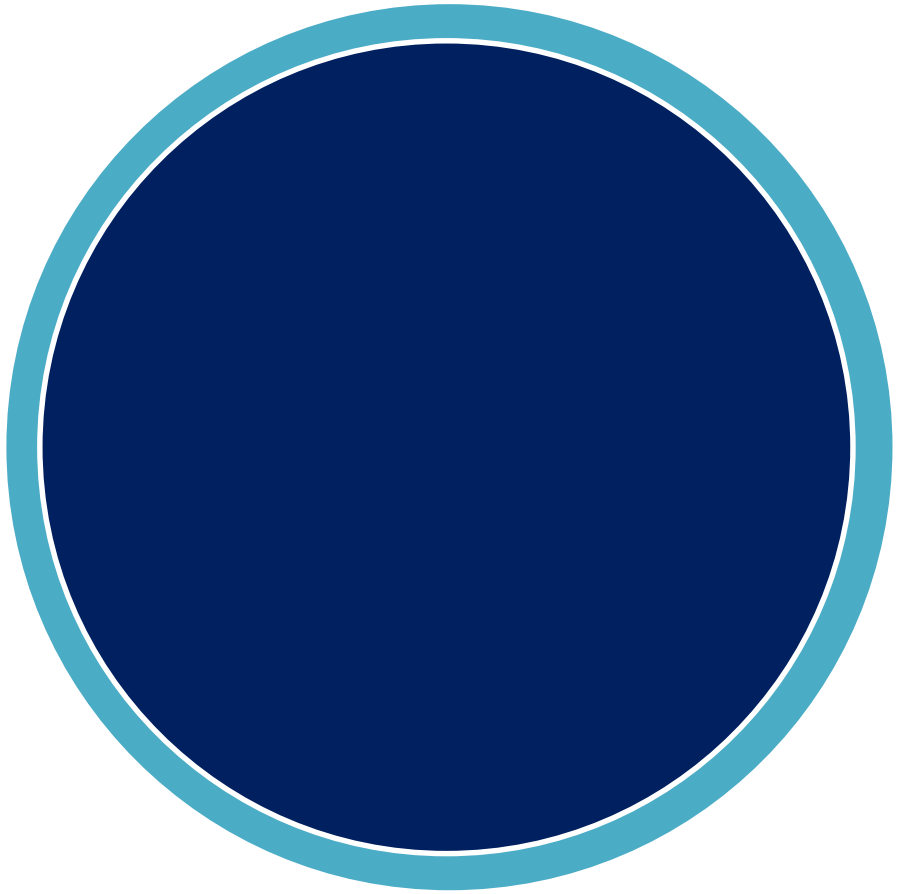
Why is Climate Information Necessary for Decision Makers?

- **Better long term economic planning in the face of Climate Change:** Climate Information/ Climate Information Services is essential in helping institutions build capacity to service needs across critical sectors of the economy in the face of Climate Change (Agriculture, Power, etc)

Why is Climate Information Necessary for Decision Makers?

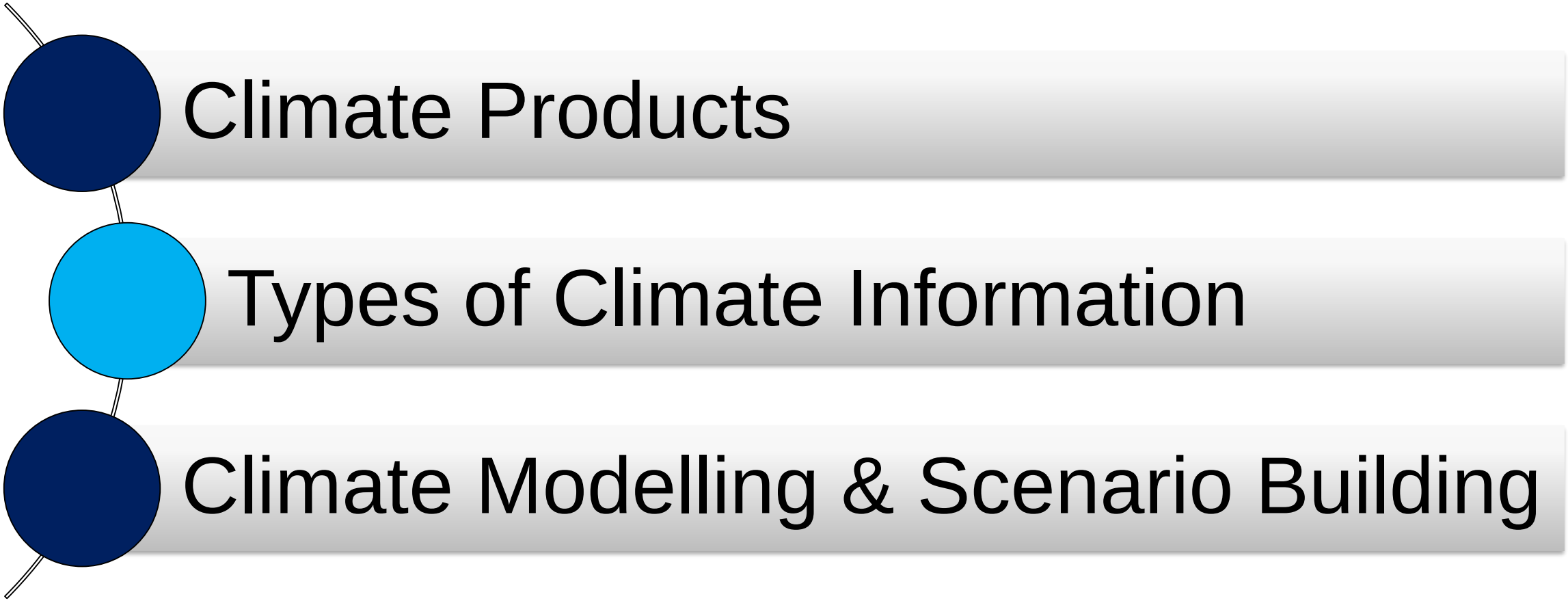
- **Stronger Disaster Risk Reduction:** Mainstreaming Climate Information/ Climate Information Services will complement disaster preparedness, by increasing the ability of early warning networks to anticipate and respond to extreme climate events

PART 2: TYPES OF CLIMATE INFORMATION



Types of Climate Information

This section contains the following headings:



What is Climate Information?

- Information from climate related data and other relevant climate information translated into customized products useful to society.
- Climate data can be used to develop:
  - Projections, forecasts, information, trends, economic analyses, assessments (including technology assessments),
  - Best practices, development and evaluation of solutions

What is Climate Information?

- **Climate information** is derived from data on temperature, rainfall, wind, humidity, sunshine hours, and other factors.

- Includes short term and long term data

- Climate data obtained from two sources:
  - From observations of the climate (e.g. wind speed) and provides information on historical events
  - From climate model outputs (can simulate both past and future periods.)

The Distinction Between Climate and Weather

We distinguish between:

Weather, which is the situation over a short time period, and

Climate, which describes long-term weather patterns or ‘average weather.

What are Climate Services?

- Is the provision of Climate Information in a way that assists decision making by individuals and organizations
  - Provides **knowledge** for **understanding the climate**, climate change and its impacts, and guidance to researchers and decision makers in policy and business
  - Can facilitate **climate-smart decisions** that will reduce the impact of climate-related disasters, improve food security and health outcome, and enhance water resource management.

What are Climate Services?

- Climate services are the dissemination of climate information to the public or a specific user.
  - Requires strong partnerships among providers and stakeholders necessary for interpreting and applying climate information for decision making, sustainable development, and improving climate information products, predictions, and outlooks
  - Stakeholders include Government agencies, academia and private sector

What is Climate Information?

- Climate Information can help build capacity and therefore increase Climate Change resilience by allowing us to:
  - Move from reactionary strategies to those that build resilience and ultimately, to proactive strategies informed by forecasts and forecast probabilities
  - Allow for flexible and proactive planning that allows stakeholders to adjust plans to climatic stresses and shocks

CLIMATE INFORMATION

GROUP DISCUSSION QUESTION 1.

FOOD FOR THOUGHT/OUTPUT OF THE WORKSHOP

What approaches/strategies can be put in place to ensure legislators mainstream climate change in policies, Legislation and development

DAY 1: DISCUSSION QUESTIONS

1. Institutions involved with climate information in your Country
2. What is their strength and weakness?
3. What can be done to support these institutions?
4. Who is responsible/The actors?

Take Home Messages

1. What is the relevance of Climate Information/Services to the following sector

    - Agriculture production and food security
    - Services Sector– Water, Energy Security, Roads and Housing
    - Disaster Risk Reduction

2. Three Issues that you will prioritize as take home message, and you will run with and try to influence other members of parliament to ensure implementation

GROUP DISCUSSION 2

Key Gaps Identified during these two days include:

- Strengthen the capacity development of CI/S infrastructure base – Meteorology, Hydrology and Related organizations
- Reinforce CI/S Linkages with Key Sectors of the Economy
- Package information to target users in the key sectors

Four Groups to Discuss how CI/S infrastructure Base can strengthened

1. Agriculture production and food security
2. Water, and Energy Security,
3. Roads and Housing
4. Disaster Risk Reduction

INFRASTRUCTURE, HUMAN SKILLS AND OTHER REQUIREMENTS FOR THE PRODUCTION OF CLIMATE INFORMATION AND DELIVERY OF CLIMATE SERVICES

Infrastructure for the Production and Delivery of Climate Information and Climate Information Services

- Weather information is generally collected from weather stations
  - These are facilities with instruments and equipment for measuring atmospheric conditions to provide information for weather forecasts and to study the weather and climate.

- Measurements taken at the weather stations include:
  - Temperature,
  - barometric pressure,
  - humidity,
  - wind speed, wind direction, and
  - precipitation (rainfall) amounts

Infrastructure for Climate Information

Few countries in Sub Saharan Africa have made adequate investments in Climate Information infrastructure.

Result is that:

- Most equipment is old, obsolete, damaged, missing, or destroyed

- Observation stations do not cover enough area to generate enough accurate data in a timely manner for decision making

SWOT Analysis of Climate Information/ Climate Information Services in Africa

Strengths

- Climate forecasts in use in agriculture sector
- Potential to improve agricultural output
- Potential to improve natural resource management
- Potential to reduce poverty & vulnerability

Weaknesses

- Non-existent/ declining infrastructure
- Low quality/ limited access to data
- Weak packaging skills

Threats

- Lack of effective communication and engagement between Climate Information users and producers
- Socio-political factors may be inimical to uptake of Climate Information in decision making processes

Opportunities

- Recover unarchived data in hard-copy for researchers
- Promote use of Climate Information decision making
- Address institutional and legal barriers preventing flow of Climate Information

Examples of Climate Information Infrastructure in Africa

Sierra Leone

- Entire rainfall monitoring network destroyed during war

Liberia

- Relies almost entirely on 1 weather station located at airport

Malawi

- Most lakeshore areas do not have reliable rainfall and weather data collection facilities.

Tanzania

- Manually operated network, data sent by post
- Hence not enough time for early warning or proactive planning

Status of Climate Information and Services in Africa (1)

- Lack of access to reliable climate information is due to:
  - Inadequate finance is allocated
  - Lack of climate information infrastructure
  - Lack of access to reliable Climate Information
  - Limited technical capacity to manage weather information systems
  - Limited systematic processes for packaging, translating and disseminating climate information and warnings
  - Lack of integration with disaster management systems.

Status of Climate Information and Services in Africa (2)

- African vulnerability to Climate Change is made worse by partly the **Inability of legislators and decision-makers to understand and communicate likely impacts** of:
  1. Climate related shocks to the economy,
  2. Impacts of CC to vulnerable populations and ecosystems and infrastructure
  3. Impacts of CC to development goals and poverty alleviation strategies.

Inadequate Finance

- Little investment goes into Meteorological departments, as other needs appear to be more pressing
- Adequate finance is needed to:
  - maintain monitoring equipment
  - Maintain well trained staff that can use and repair equipment
  - Maintain capacity to process data and develop early warning packages

Examples of the State of Finance for Climate Information in Africa

Tanzania

- Tanzania Met Five Year Plan needs 35 million US$ over 5 years to enhance services and infrastructure.
- Only 15% has been funded to date.

Burkina Faso

- About 40% of the hydrological equipment in the country to become non-operational

Sierra Leone

- Department of Water Resources has been recently created but no indication of the budget being available on yearly basis

Limited Technical Capacity to Manage Weather Information Systems

- Weak scientific and technical capabilities required to effectively identify hazards and forecast potential impacts due to:
  - Lack of infrastructure (i.e. computational equipment) & software
  - Weak human capacity to program and run software to generate forecasts
  - Forecasters limited by lack of equipment & processing software
  - High turn over rates (well trained staff often lured into more lucrative work)

Non-existence of Systematic Processes for Packaging, Translating and Disseminating Climate Information and Warnings

Limited packaging of climate information and warnings and inappropriate communication to different sectors and end-users:

- Weak institutional arrangements
- Absence of policy and legal frameworks to guide provision of meteorological services
- Limited appreciation and use of meteorological services by other sectors of the economy.

Weak Institutional Coordination

- Duplication of costs
- Delays in transmission of data
- Weakened analysis of data as it is often fragmented and stored in different departments.
- Inadequate combination of climate, agriculture and environmental data and information for transmission as message to end users

Poor coordination and communication amongst agencies that share climate monitoring responsibilities.

Weak Institutional Coordination

Tanzania

- No unified and database on weather, climate and hydrology for sectoral users
- Hence no source of credible information for long-term planning.

Liberia

- National Meteorological Agency is non exist

Uganda

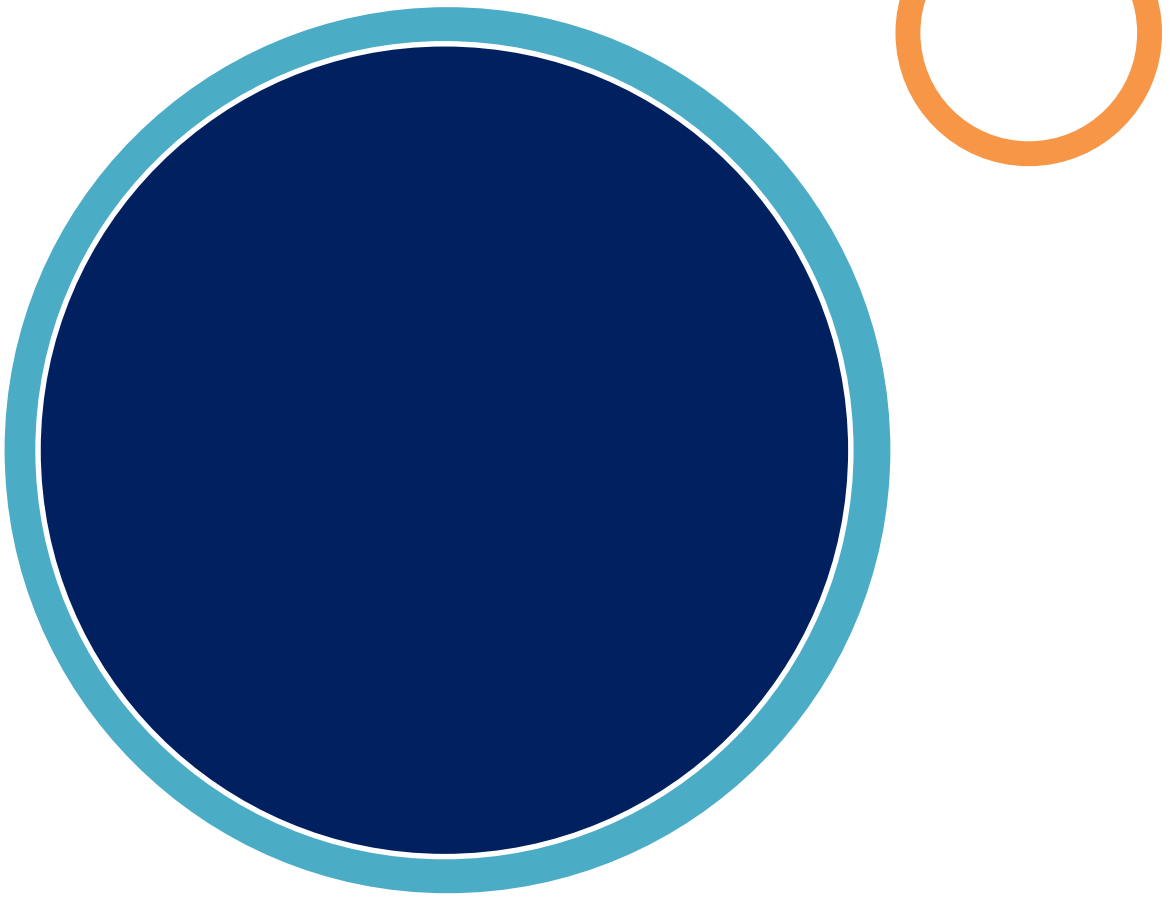
- Climate & agriculture data from Meteorology and agriculture ministry are not used to develop useful information to enable local farmers plan for season & risk reduction measures

Disaster Risk Reduction

- Climate information plays a key role in disaster mitigation and management.

- However, weak institutional and policy coordination hamper the effectiveness of the use of climate information in disaster management in Africa.

PART 3: TYPES OF CLIMATE INFORMATION



Types of Climate Information

Weather Forecasts

- Emissions Scenarios

Interpretation of Climate Information

Climate Information and Products

- Include an extensive array of general and user-specific information, prediction, warning and advisories ranging from general public information to customized products.

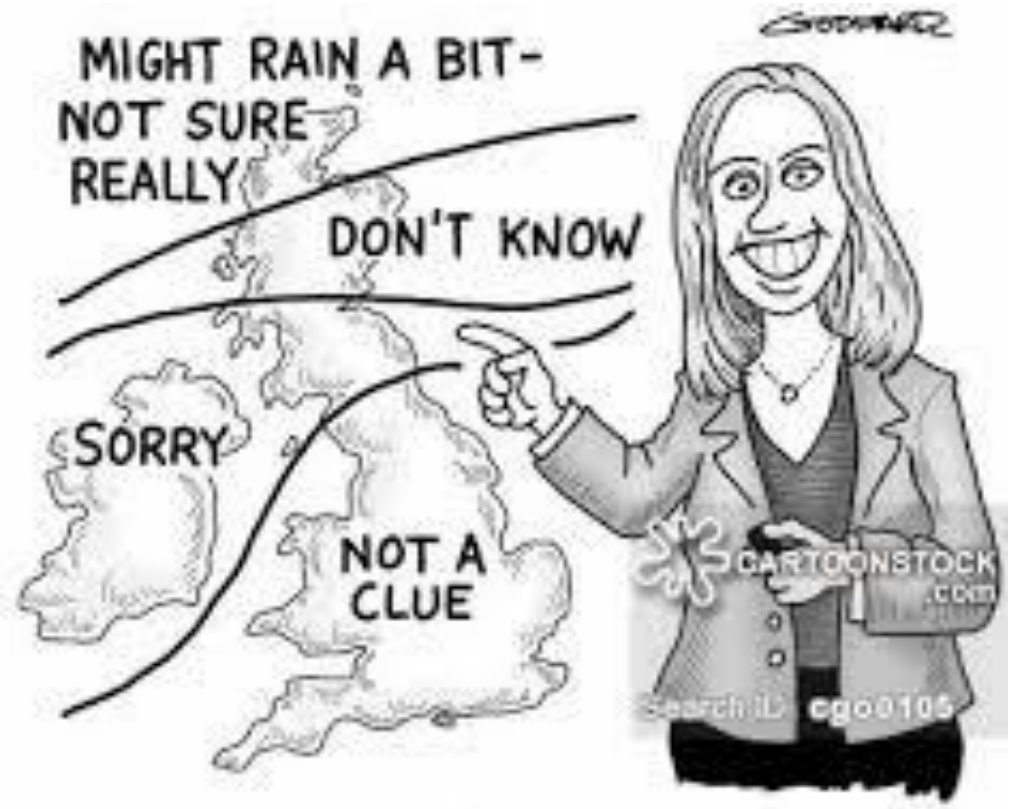
- Collected, assessed and assembled into products that are disseminated to users

- Users in turn provide feedback on their needs for improvement of the products.

Weather Forecasts

– Weather forecasting is a prediction of what the weather will be like at a future point in time

– It involves a combination of computer models, observations, and a knowledge of trends and patterns.



Honest weather forecasting.

Emissions Scenarios

Why develop scenarios?

- Human activity has drastically increased amount of Green House Gases (GHCs)s in atmosphere

- Led to more heat being trapped & increase in global average surface temperatures

- Scientists have observed changes in the climate system as a result, like more extreme weather events, sea level rise and changes in rainfall

Emissions Scenarios

- Describe future releases of Green House Gases (GHG), aerosols, and other pollutants into atmosphere
- Combined with information on land use and land cover to provide inputs to climate models.
- Based on assumptions about driving forces such as economic & population growth & technology development.
- Assist in climate change analysis, including climate modelling, impact assessments for adaptation and mitigation.

Paris Agreement and Emissions Scenarios

- 195 countries adopted first-ever **universal, legally binding, global** climate deal at the Paris Meeting in December 2015.
- Sets out global action plan to avoid dangerous climate change by limiting global warming to well below 2°C.
- Due to enter into force in 2020.

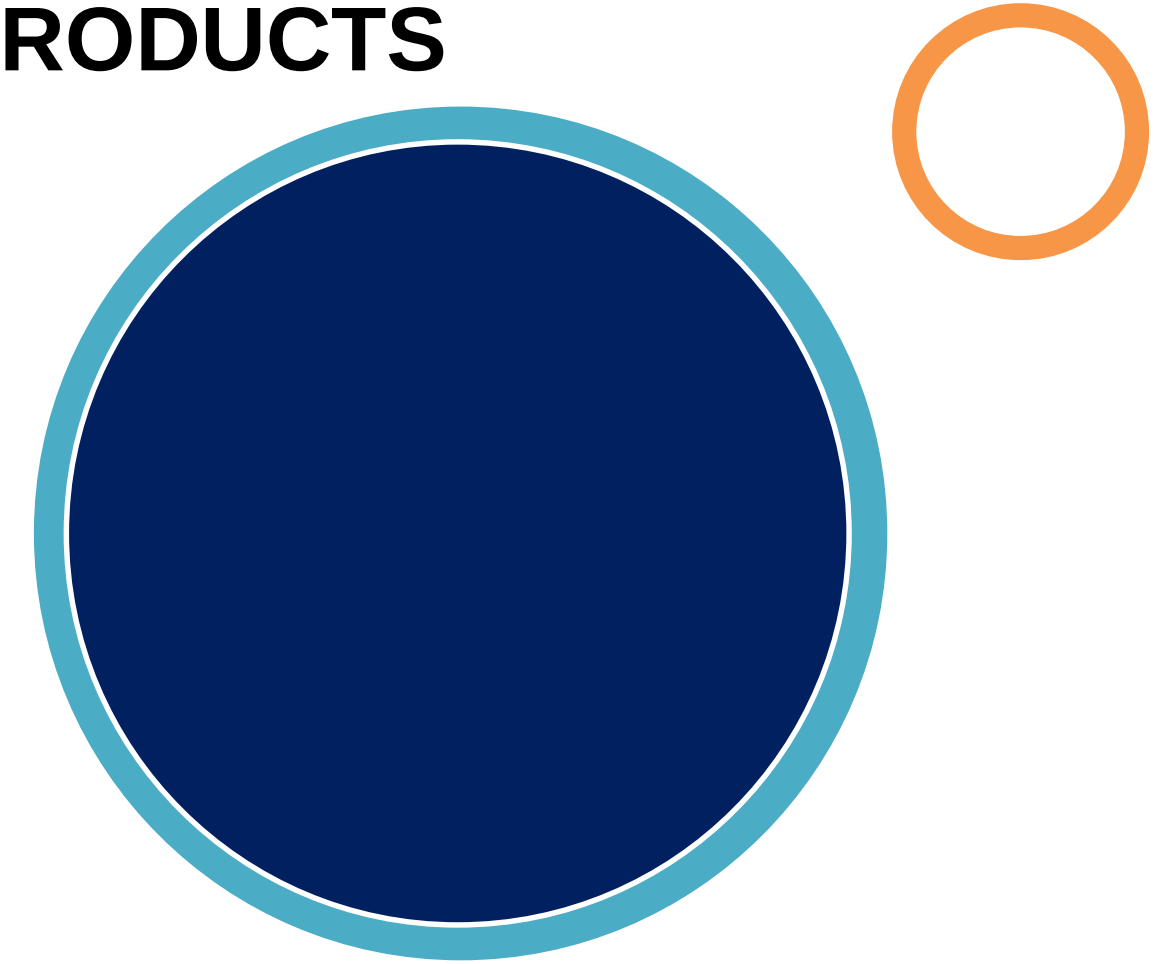
Paris Agreement and Emissions Scenarios

- Governments agreed to;
  - Keep increase in global average temperature to well below **2°C** above pre-industrial levels
  - Aim to limit the increase to **1.5°C**
  - On the need for global emissions to peak as soon as possible, recognizing that this will take longer for developing countries
  - Undertake rapid reductions in accordance with the best available science

Interpretation of Historical Climate Information

- Data records of past climate. Can be:
  - **Inter-annual:** compares how climate can shift from year to year
  - **Decadal:** shows how climate can shift over periods of 10 - 30 years
  - **Long term:** shows how climate can shift over the long term (beyond 30 years).

PART 4: CLIMATE SERVICES AND PRODUCTS



Climate Services and Products

Categories of Climate Information

- Basic
- Intermediate
- Advanced

Communicating Climate Information

- Communication Methods
- Stakeholders in Climate Information

Climate Services

- Climate product refers to the climate information that is provided to the user.
- Designed for basic, intermediate and advanced use and come in the forms of:
  - Statistical summaries of historical data
  - Indices derived from such data (e.g. climatological information/changes in climate)
  - Forecasts on various time scales (e.g. daily weather forecasts and seasonal climate outlooks).
  - Warnings and Alerts

What Value do Climate Services Add?

Basic Climate Information

Sources

- Historical Climate Information
- Future climate projections

Scale

- Presents historical trends and future mean changes
- Large spatial and temporal scales
- Presents simple climate variables

Uses

- Raising initial awareness
- Risk scanning
- High level governance

Basic Climate Products: Summary

- Used to present both past and future changes
- Summarizes historical trends or projected changes for a given future time horizon and region of interest
- Expressed for different time periods (monthly, seasonal, or annual).
- Summary can be done for any area of interest, such as global, provincial, or regional scales.

Basic Climate Information: Historical Trends

Historical trends: Used to present long-term evolution of the past climate

- Provides adjusted and homogenized climate data for selected region
- Figures can represent simple climatic variables such as mean temperature and precipitation
- Data can be averaged over different regions of interest and for different time steps like ‘seasonal’, ‘monthly’ or ‘daily’, depending on the availability of the data.

Intermediate Climate Information

Sources

- Future climate projections

Scale

- Includes a series of more complex formats
- In-depth analysis of the figures

Uses

- Undertaking vulnerability assessments
- Undertaking impact studies
- increase resilience

Intermediate Climate Products

- IGAD Climate Prediction and Application Centre (ICPAC) provides more sophisticated products:
  - Longer term trends analysing changes in rainfall, air temperature, soil moisture, evapotranspiration (2020, 2030, 2050, 2070, 2100)
  - Environmental Monitoring, particularly for droughts and floods
  - Analysis of intra-seasonal rainfall characteristics for the onset, intensity and duration of dry and wet spells in eastern Africa

Advanced Climate Information

Sources

- Detailed analysis of future climate changes
- Also estimates changes in extreme events

Scale

- Tailored specifically to user needs
- Often not relevant or usable by others

Uses

- Evaluating adaptation measures
- Research and development
- Local governance

Categories of Advanced Climate Information

Specific format

- Used to present future changes or values using a format that is specifically tailored to the user

Temporal series

- Used to provide climate data (e.g. outputs from climate models) that are subsequently used in impact models

Analysis

- Analysis of low-confidence climate indices and events

Climate Information Products in Africa

Zambia

- Daily weather forecasts for e-mail and radio
- Seasonal rainfall forecasts issued in Sept/October
- TV weather reports and forecasts 3 times a week
- 10-day Crop Weather Bulletin during rainy season
- Aviation forecasts at airports and aerodromes
- Severe weather warnings issued when an event is anticipated
- Technical reports/publications issued periodically
- Climate data on request

Burkina Faso

- Bulletins with general information on: min/ max temperature of the current and next day, quantity of rainfall (mm) and state of visibility in different geographical regions

Climate Information Products in Africa

Tanzania

- Seasonal precipitation forecast on website
- Includes basic analysis of the impacts on agriculture, basic crop and livestock advice
- Short-term (daily) forecasts

Liberia

- Occasional weather and climate forecasts

Communicating Climate Information

National

- New Member States (NMS) responsible for collection and dissemination of Climate Information

Regional

- Bodies such as IGAD Climate Prediction & Application Centre (ICPAC) provide more sophisticated Climate Information and Climate Information Services

Global

- World Meteorological Organization is umbrella organisation for New Member States.
- Maintains Regional Centres of Excellence to assist member States
- Provides climate data services, monitoring products and long-range forecasts

The World Meteorological Organization

Maintains global climate data and information, including:

- global climate normals
- world weather records
- world weather and climate extremes records
- global surface temperature data sets
- global precipitation data sets

World Meteorological Organisation

Develops climate monitoring products, including:

- Annual World Meteorological Organization Statement on the Status of the Global Climate,
- El Niño Southern Oscillation (ENSO) Updates,
- Global Atmospheric Constituent Bulletins on Greenhouse Gases and the Ozone Layer

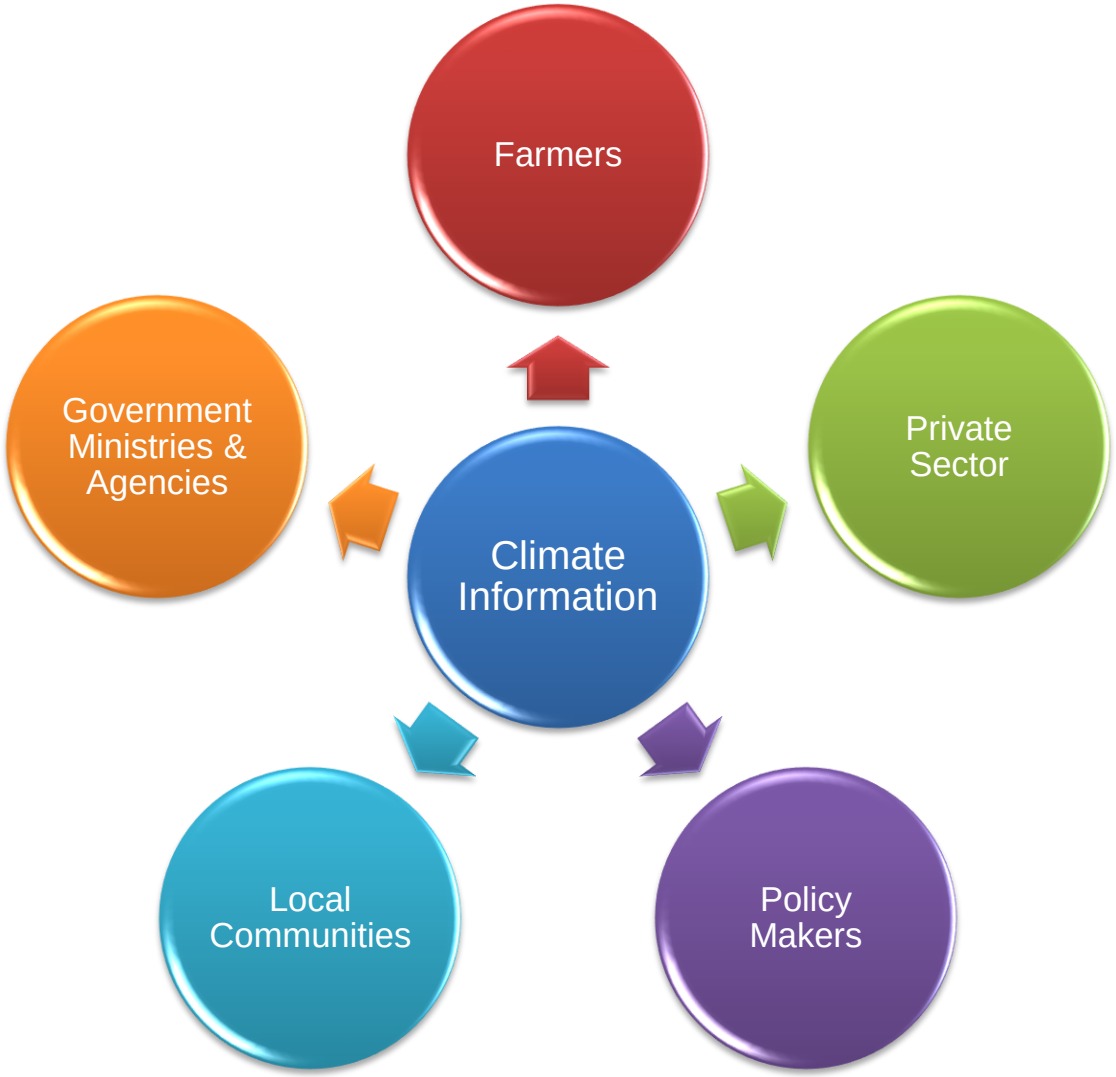
Communicating Climate Information

- In Africa, common methods of communication include:
  - **Traditional media channels**: television, radio and newspaper broadcasts
  - **Information bulletins:** Contain more detailed information and analysis of weather forecasts
  - **Internet:** emails, National Meteorological Service website, social media
  - **Public displays and social forums:** billboards, community organizations and barazas

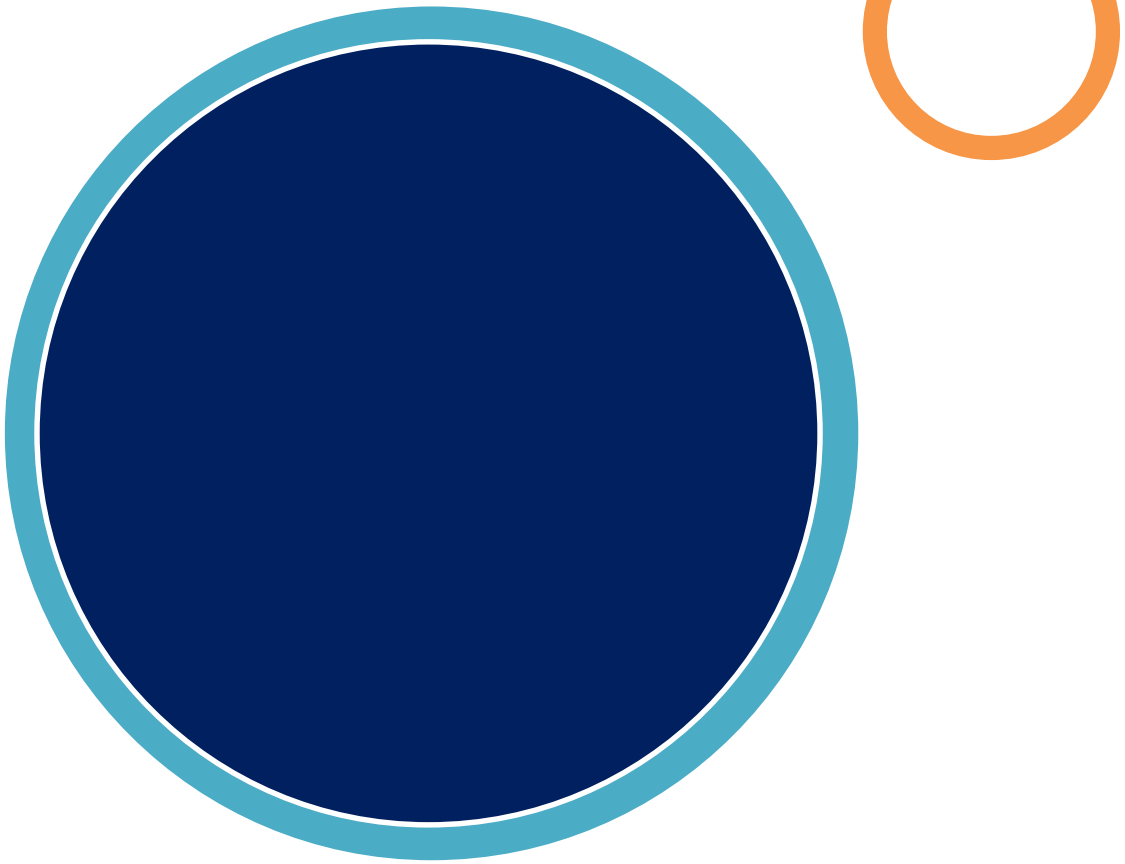
Communicating Climate Information

- In Africa, common methods of communication include:
  - **Text Message services:** paid services such as SMSs, free messaging services such as WhatsApp e.tc.
  - **Public Service Announcements:** Media broadcasts that communicate a simple message to the general public. Useful for issuing early warnings & general advice on what to do during weather events such as floods or thunderstorms.
  - **On demand:** Provision of information upon request

Stakeholders and Users of Climate Information



PART 5: USES OF CLIMATE INFORMATION



Uses of Climate Information

What does this section contain?

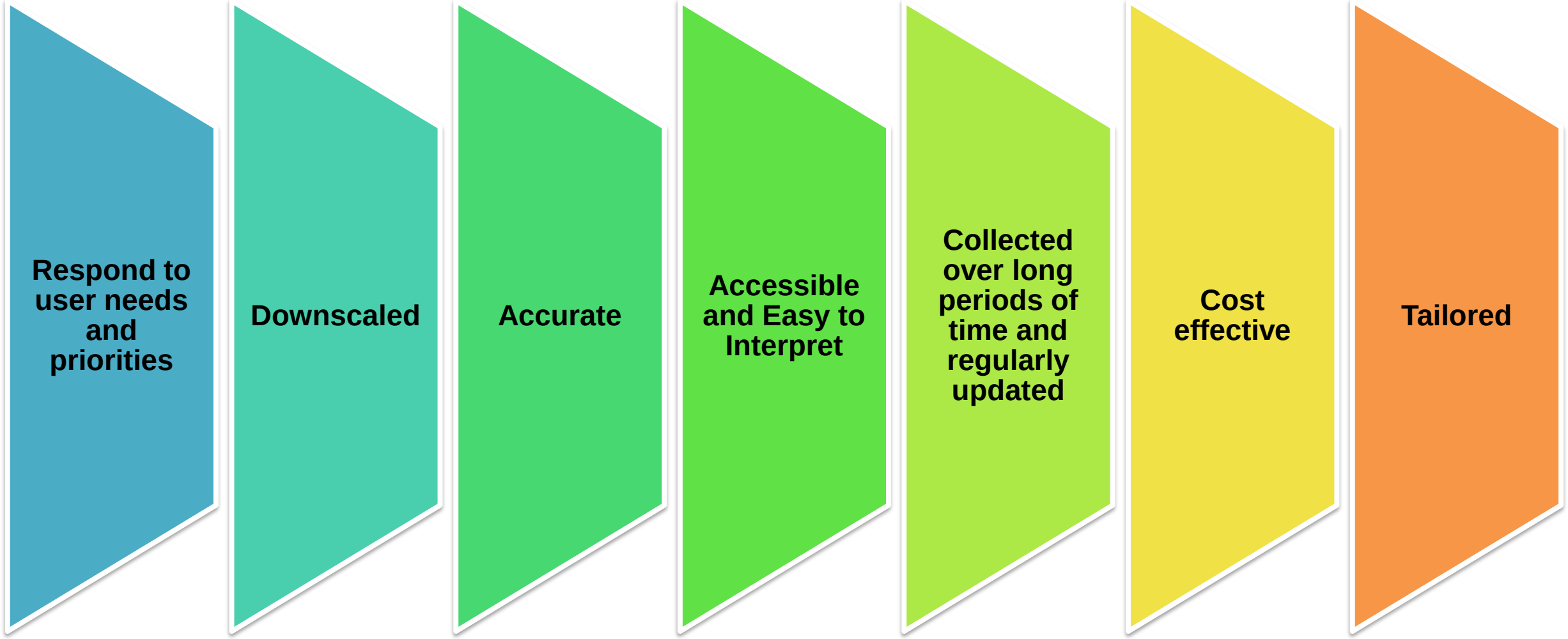
- Climate Information for decision making in the following sector:
  - Development Planning
  - Agricultural Extension Services
  - Infrastructure and Construction
  - Urban and Spatial Development Planning
  - Disaster Risk Reduction
  - Intended Nationally Determined Contributions and Sectoral Planning

How can Climate Information Help Africa Achieve Development Goals?

Climate Information can be used to build Africa's resilience to Climate Change through informing decision-making across social, economic, political and ecological dimensions by:

Guiding sustainability and effectiveness of long-term development objectives	Minimising risk of decisions that will increase vulnerability of sectors and livelihoods	Factoring Climate information into planning and investments promotes achievement of long and medium term development goals

Elements of Climate Information Necessary for Effective Decision Making



How can Climate Information Help Africa Achieve Development Goals?

Effective Climate Information for decision making is:

Responsive to user needs and priorities: practical application to decision makers, communities and other stakeholders.

Downscaled: to draw effective localised conclusions for plans and policies and to identify uncertainties, opportunities and barriers.

Accurate: so as to clearly define risks to be accommodated

How can Climate Information Help Africa Achieve Development Goals?

Effective Climate Information for decision making is:

- **Accessible**: easy to find and interpret by users
- Have been collected over a long period of time (historic trends) and frequently updated
- **Cost effective:** since there are limited resources to manage information systems
- **Tailored:** to respond to specific needs of users, risks, vulnerable populations and ecosystems, in order to avoid information overload.

Why has Climate Information Not been Mainstreamed in Long Term Decision Making in Africa?

- Minimal effort to integrate Climate Information in these programmes/projects due to:

  - **Pressing short-term development challenges:** ‘forces’ decision makers to focus on shorter time scales

  - **Climate Information not well placed to inform socio-economic & environmental considerations**: lack of integrated assessments of climate impacts, vulnerability and adaptation, Climate Information does not inform considerations that dictate investment trade-offs

Why has Climate Information Not Been Mainstreamed in Long Term Decision Making in Africa?

- Minimal effort to integrate Climate Information in these programmes/projects due to:

  - **Lack of clear communication between producers and users of Climate Information**: Climate Information shared with decision makers is highly technical and could easily lead to misunderstanding of the uncertainties.

  - **Needs of decision makers are rarely communicated to climate scientists** – information should be aligned with needs of decision makers

Avenues for Supporting Climate Information in Africa

- Provision of Climate Information can be improved through:-
  - Support climate related technologies and build capacities of scientific institutions
  - Improve usefulness and relevance of Climate Information by tailoring it to sectors
  - Identify and address political and institutional barriers
  - Assist decision-makers to make informed decisions despite uncertainty about the future climate.

Climate Information and Agricultural Extension Services

- Majority of local agricultural communities world-wide use climate forecasts (traditional or modern) to predict seasonal climate behaviour

- Increasing climate knowledge and improving prediction capabilities generates relevant information and prediction products that advise farmers' such as timing for cultivation, harvesting

Climate Information and Agricultural Extension Services

- Farmers can exploit opportunities generated by weather and climate predictions by:
  - Minimizing impacts of hazards through planning how to avoid the risk or taking precautionary measures;
  - Maximizing on the predicted variability such as building water storage tanks to store water for irrigation

Infrastructure and Construction

- Precipitation, temperature and wind can affect infrastructure and Construction sector
- Infrastructure damage affects national economy as other economic sectors depend on infrastructure
- Budget allocations for repairs and re-construction affects the economy since money is channelled from developmental initiatives

Precipitation/Rainfall

- Precipitation can greatly damage infrastructure:
  - Floods, mudslides, landslides and silting destroy/wash away buildings, roads, bridges as well as top soils and structural engineering which support roads, tunnels, and bridges.
  - Siltation can hamper railway transport and shipping
- Decrease or increase in sea level affects ship and boat docking, increase in sea level sub-merges buildings, roads etc
- Mist/fog impair visibility e.g. road, air, water transport

Winds

Winds

- Strong wind speeds and sand storms pose danger to road, air and water transport, destroy buildings, drainage facilities

Temperature

- Very high temperatures cause melting and buckling of metal on buildings, railway lines and other infrastructure, melting of tarmac etc.

- Freezing temperatures cause metal contraction hence loosen joints in infrastructure, loosen road particles etc

Roads melting in India due to heatwave

Wildfires in Canada

“It’s an unprecedented fire with respect to the rate it spread, how it involved the community…The way this thing happened, the way it travelled, the way it behaved – they’re rewriting their formulas on how fires behave, based on this fire,” Darby Allen, Regional Fire Chief

Reach of the Alberta Fire

- Estimated to cover 355,000 hectares in Alberta, heartland of Canada's oil sands industry
- 17 wildfires burning; 4 out of control
  - Could become costliest disaster in Canadian history
  - Shutdowns at many oil-sands sites have reduced production by 1 million barrels of oil a day (40% of total oil-sands output.)

What Caused the Fire?

- It is still unclear what started the fire
- Wildfire is a natural part of the boreal environment, esp. during wildfire season
- Scientists speculate that a mild winter (due to El Nino) saw the fire season start 4 weeks earlier than usual and helped created very dry conditions*.

In some places Temperatures were higher by as much as 5 degrees

Heat Wave in India

– India recorded 51^{O}C, the highest ever temperature in May 2016 in Phalodi, Western India

– Many areas experienced severe heat waves

– 3rd Highest heat record on earth

India Heat Wave

Melting roads in new Delhi

Dried up lake in Ahmadabad, Western India

Heat Wave in India

- Heat wave has also coincided drought.

- Water shortages due to 2 years of poor monsoon
- Crop failure has forced tens of thousands of farmers to abandon their land and homes to move to the urban cities.
- Suicide rate among farmers in the past 16 months has reached 1548.

Paris Floods

- 3 days of heavy rain at the end of May led to most severe flood in Paris since 1910
- Led to evacuation of thousands of people in the country
- Closure of River Seine waterway as water levels rose
- Flooding of buildings and metro
- Evacuation of artwork from Louvre basements

Paris Floods

- Scientists found that the Paris floods were made almost twice as likely to happen because of global warming.

i.e.: what was a 1 in 200 year event is more like a 1 in 100 year event

Disaster Risk Reduction

- Majority of disasters experienced in Africa are weather or climate driven:
  - Rainfall and temperature directly correlate with natural disasters including floods, vector and waterborne diseases, pest outbreaks, storms, heat wave, famine, wild fires & land-slides.
  - Frequency and intensity of weather related hazards is projected to increase in the near future due to Climate Change
  - Exacerbated by rapid environmental degradation, poverty, rapid population growth and poor health care systems
  - Future hazards will be more severe in terms of scope and losses

Using Climate Information for Effective Disaster Risk Reduction

- Disaster Risk Reduction is being adopted world-wide to reduce vulnerability of communities to disasters & build resilience

  - Important as intensity and frequency of weather related hazards will increase due to climate change

  - Necessary to use meteorological, hydrological and Climate Information as part of a comprehensive multi-sector, multi-hazard, and multi-level approach to Disaster Risk Reduction

Using Climate Information for Effective Disaster Risk Reduction

- Climate information can be used for:
  - Forecasting, combined with proactive Disaster Risk Reduction policies and tools,
  - including contingency planning and early warning systems
  - Undertaking Quantitative Risk Assessments
  - Development of Risk Management Strategies and Early Warning Systems

Uses of Climate Information in Disaster Risk Reduction

Forecasting, combined with proactive Disaster Risk Reduction policies and tools, including contingency planning and early warning systems	Undertaking Quantitative Risk Assessments	Development of Risk Management Strategies and Early Warning Systems

Using Climate Information for Effective Disaster Risk Reduction: Qualitative Risk Assessments

- Involves combining information on hazards with exposures and vulnerabilities of the community or property
- Assessment includes analysis of:
    - Historical climate data
    - forward looking modelling and forecasting about environmental conditions Socio-economic data to analyse exposure and vulnerability

❖ Can be used to analyse risk hazard for agricultural production, infrastructure and homes, etc

❖ Contribute to community planning and preparedness

Using Climate Information in Development of Risk Management Strategy (RMS)

A Risk Management Strategy can be developed using Early Warming Systems. Early Warning Systems reduce damages inflicted by meteorological hazards:

Climate prediction increases lead times of early warnings, such as seasonal climate forecasts that assist in prediction and management of excessive or deficient precipitation.

Historical climate data is used for analysis of hazard patterns in the face of climate change and variability

Examples include coastal zone management, development of new building codes and the retrofitting of infrastructure to withstand more frequent and severe hazards.

Using CI for Early Warning and Emergency Response Operations

- Early Warning and Emergency response Operations:

- In-order to reduce disaster risks, Early Warning Systems:

  - Detect, monitor and forecast hazards
  - Analyse risks and incorporate risk information in emergency planning and warnings
  - Disseminate warnings that are timely and authoritative
  - Contribute to community planning and preparedness

Intended Nationally Determined Contributions

- Intended Nationally Determined Contributions (INDC) refer to efforts that signatory States intend to implement so as to reduce Green House Gases (GHG) emissions

- Development of INDCs started after United Nations Climate Change Conference (COP 19) in Warsaw in preparation for the United Nations Conference on Climate Change (COP 21) (Held in Paris, 2015)

- Core aim of United Nations Conference on Climate Change (COP 21) to generate an International Climate Agreement

Intended Nationally Determined Contributions

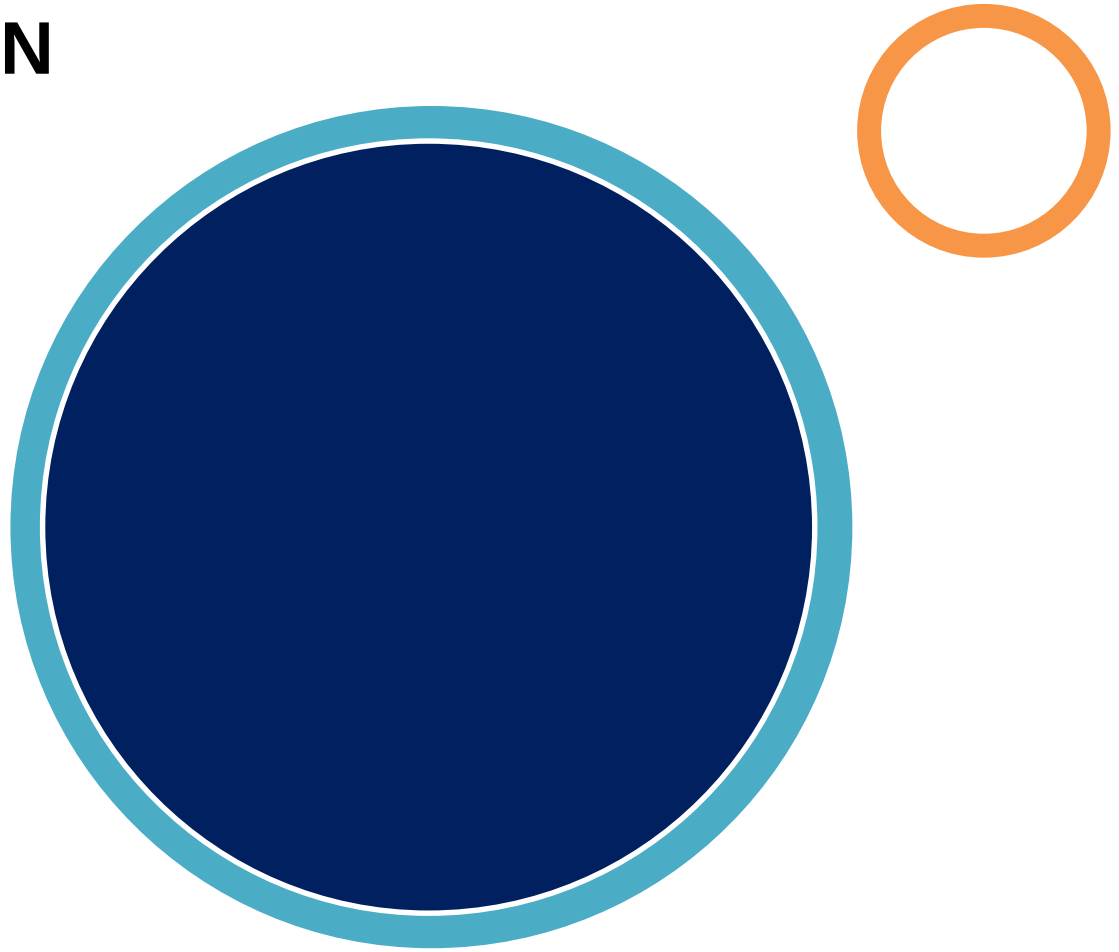
- INDCs:
  - Provide a means in which governments communicate internationally, how they intend to address climate change nationally (in their respective countries);
  - Reflect each country's ambition towards reduction of Green House Gases (GHGs);
  - Show how each country intends to adapt to climate change, what support they need to do so and what support they will provide to other nations to adopt low-carbon pathways and build climate resilience.

Conclusion

- Effective mainstreaming of Climate Information in planning and routine incorporation of climate risk into decision-making will contribute to Climate Change mitigation and adaptation

- Only achieved if National Meteorological & Hydrological Services(NMHSs) and other Climate Service providers strengthen their observational networks and enhance capacity to deliver the full range of climate services in support of sustainable development.

PART 6: CLIMATE INFORMATION AND SERVICES AND LEGISLATION



Climate Information and Services and Legislation

- This section contains the following sub-headings:
  - Legislating for Investment in Climate Information and Services
  - Budgeting and other Statutory Provisions
  - Public Private Partnerships (PPPs)
  - Climate Services as a Business Model
  - Institutional Development for Climate Information/Climate Information Services.

Budgeting and Other Statutory Provisions

- Serious need to invest in Climate Information in Africa:
  - Africa covers a fifth of the world's total land area, but has the least developed land-based observation network of all continents, and one that is in a deteriorating state,
  - This amounts to only 1/8 of the minimum density required by the World Meteorological Organization.
  - Exacerbated by a stagnant pool of human and financial resources and obsolete technologies that limit capacity to produce the best services needed by decision-makers

Budgeting and Other Statutory Positions

- Underinvestment in Climate Infrastructure:
  - Results in low quality and unreliable data for making management decisions related to climate change induced disaster risks
  - Limits a country's ability to plan for slow-onset climate hazards that will require a transformational shift in economic development and risk reduction efforts.
  - A Climate Information and Early Warning Systems is an important part of adapting to Climate Change related impacts, as it increases resilience to future changes in climate/weather-related hazards.

Budgeting and Other Statutory Positions

- Climate Information/Climate Information Services are considered a public good as they are expensive to produce but relatively cheap to reproduce
- Increasing budget for Climate Information can be justified by linking Climate Information/Climate Information Services directly to national development goals, such as:
  - the linkage between Climate Information/Climate Information Service & Early Warning Systems
  - food security
  - water resources management
  - health risk management
  - terrestrial and coastal ecosystem resilience

Budgeting and Other Statutory Positions

- In order to provide stakeholders with appropriate Climate Information/Climate Information Services, it is vital for Africa's governments and policy makers to:
  - take on board the contribution of National Meteorological & Hydrological Services to socio-economic planning and development,
  - integrate them in national development programmes
  - accord the necessary financial support

Public Private Partnerships (PPPs)

- Public Private Partnerships can be used to boost investments and increase funding for National Meteorological & Hydrological services.
  - A Public Private Partnership is a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance.
  - Public Private Partnerships offer a way to bring expertise, capital, and a profit-driven approach to delivery of public services and are useful in a time of rapid evolution in technologies.

Climate Service as a Business Model

- Climate Service have been established with assumption that an active market of users and stakeholders is in place to rapidly benefit from science-based information.
- However:
  - Market has only been partially established: weak relation between Climate Service and potential stakeholders
  - Need to analyse potential market and to narrow the gap between information providers and prospective users.

Climate Service as a Business Model

- The explanations for the lack of connection involve several factors:
  - Insufficient awareness by some societal actors of their vulnerability to future climate change
  - Lack of relevant and timely products and services offered by the scientific community,
  - Inappropriate format in which the information is provided
  - Inadequate business model adopted by the climate services.

Institutional Development for Climate Information / Services

- Climate Information/ Climate Information Service are limited due to weak institutional coordination between institutions
- Some reasons as to why this is the case include:
  - Limited appreciation and use of meteorological services by other sectors of the economy
  - Weak organisational structures and capacity for effective weather and climate monitoring and/or early warning generation and dissemination
  - Lack of legal frameworks for establishment of National Meteorological & Hydrological Services in many Member countries;
  - Lack of a defined framework for mainstreaming meteorology in national development;
  - Non-existent, obsolete or inadequate observation infrastructure

Institutional Development for Climate Information / Services

- Africa Ministerial Conference on Meteorology (AMCOMET) strategy seeks to formulate policies and provide legislation to:
  - ensure that National Meteorological & Hydrological Services (NMHSs) are more semi- autonomous
  - ensure that they develop strategic plans and charters aligned with national development plans
  - facilitate regular meetings with policy makers to demonstrate relevance
  - facilitate close cooperation from Regional Economic Communities to support production and delivery of weather and climate services.

CLIMATE INFORMATION AND SERVICES IN DOMESTICATING INTERNATIONAL CLIMATE AND ENVIRONMENTAL AGREEMENTS

Climate Information and Services in domesticating international climate and environmental agreements

- This section contains the following sub-headings:
  - The Global Framework for Climate Services
  - African Ministerial Conference on Meteorology
  - Nationally Determined Contributions
  - Monitoring and Evaluation
  - Using Climate Information for Investment Assessments

The Global Framework for Climate Services (GFCS)

- Aims to enable society to manage the risks and opportunities arising from climate variability and change better, especially for those who are most vulnerable to such risks.
  - Focuses on four priority areas, namely: Agriculture and Food Security (including fisheries and aquaculture); Disaster Risk Reduction; Health, and; Water.
  - Long-term high-level outcomes and benefits are that user communities make climate-smart decisions and that;
  - Climate Information is disseminated effectively and in a manner that leads easily to practical action

The Global Framework for Climate Services

- The Framework has five overarching goals:
  - Reducing the vulnerability of society to climate-related hazards through better provision of climate information
  - Advancing the key global development goals through better provision of climate information
  - Mainstreaming the use of climate information in decision-making
  - Strengthening the engagement of providers and users of climate services
  - Maximizing the utility of existing climate service infrastructure

Components of the Global Framework for Climate Services

User Interface Platform	• structured means for users, climate researchers and Climate Information providers to interact at all levels
Climate Services Information System	• How Climate Information will be collected, stored and processed to develop products and services that inform decision-making across climate-sensitive activities
Observations & Monitoring	• to ensure that climate observations to meet needs of end-users are collected, managed and disseminated and are supported by relevant metadata
Research, Modelling and Prediction	• to foster research towards continually improving the scientific quality of climate information, providing evidence for the Climate Change impacts and variability and for cost-effectiveness of using Climate Information.
Capacity Development	• to address specific capacity development requirements identified in the other pillars as well as basic requirements for enabling Framework related activities to occur.

Implementation of the Global Framework for Climate Services.

- The Framework will be implemented through activities and projects that will be enabled by mobilizing the necessary resources, including funding.
  - Objectives will evolve as implementation matures and initial successes are realized
  - After six years it is expected that improvements to climate services in priority areas will be measurable and activities in other areas will be initiated as new priorities emerge.
  - After ten years there will be access to improved climate services throughout the world and across all climate-sensitive sectors

African Ministerial Conference on Meteorology

- Established in 2010 as a high level mechanism for the development of meteorology and its applications in Africa.

- Ministers recognized that sound governance of the science of meteorology and its related applications must be streamlined in national development agendas to promote cooperation, security, socio-economic development and poverty eradication on a pan-African level.

AMCOMET Commitments

Strengthen and sustain National Meteorological Services by providing them with resources and appropriate institutional frameworks to enable them to execute their functions (observations, forecasting and applications)

Recognise role of National Meteorological Services as fundamental component of national development infrastructure, ensure that meteorological information is a permanent feature in national current and future plans, programmes and policies in key economic sectors

Regard National Meteorological Services as strategic national assets that contribute to national security, esp. transport, food, water, energy and health & vital to sustainable development particularly poverty reduction efforts, CC mitigation and adaptation and DRR

Ensure that all sub regions are active and are adequately resourced

Nationally Determined Contributions

Paris Climate Agreement commits to:

> “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2”
>
> (Global Adaptation Goal)

Nationally Determined Contributions

- Parties are bound to strengthen cooperation on enhancing action on adaptation including:
  - Information sharing such as best practices, lessons learnt, and, experiences
  - Strengthening institutional arrangements
  - Strengthening scientific knowledge on climate
  - Providing support to developing nations in identifying effective adaptation practices, adaptation needs etc
  - Improving the effectiveness and durability of adaptation actions.

Nationally Determined Contributions

- Climate services will have to monitor efficacy and relevance of Intended Nationally Determined Contributions (INDCs) & can help to meet the following goals of the Paris Climate Agreement;
  - assessing adaptation needs with a view to assisting developing countries and
  - strengthening regional cooperation on adaptation where appropriate and, where necessary, establish regional centers and networks, in particular in developing countries

Using Climate Information for Investment Assessments

- “Climate proofing” is a process that aims to identify risks that an investment project may face as a result of climate change, and to reduce those risks to levels considered to be acceptable, and a measure aimed at mitigating the climate risk to which a project is exposed.

- Climate proofing an investment is based on an economic analysis that seeks to address questions of the following nature:

Considerations on Climate Proofing an Investment

What are the impacts of projected Climate Change on the costs and benefits of the investment project?

Is climate proofing the investment project desirable or should project proceed without climate proofing?

If there are multiple technically feasible and economically desirable climate-proofing measures, which one should be recommended?

Should co-benefits associated with some climate-proofing measures, such as ecosystem-based approaches, be included in the economic analysis?

If climate proofing is desirable, when is the best time to undertake investment over the course of the lifetime of the project?

Should climate proofing be postponed until better information is available and allows the use of actual and observed climate conditions instead of uncertain climate projections?

Considerations on Climate Proofing an Investment

- Uncertainties in Climate Change projections do not invalidate conducting an economic analysis of an investment project in order to undertake climate proofing measures.
- Undertaking an economic analysis of an investment can result in:
  - climate proof now
  - make the project climate-ready
  - wait, collect information and data, and revise if needed.

Why is Climate Proofing Investments Necessary?

- Many developing countries are making investments to revitalise economies and boost living standards
  - Effects of climate change: more intense rainfall and more frequent and more intense droughts, floods, heat waves, and other extreme weather events will have implications for economic development and wellbeing
  - Adaptation measures make the effects of climate change less disruptive; spare the poor and the vulnerable from unduly high burden and; protect development gains achieved so far

Why is Climate Proofing Investments Necessary?

- World Bank's global study on —Economics of Adaptation to Climate Change (2009) found that:
  - cost of adapting to Climate Change in developing countries to be $75-$100 billion per year for the period 2010 to 2050.
  - Equivalent to 0.2% of the projected Gross Domestic Product (GDP) of all developing countries
  - Accounts for as much as 80% of total current Official Development Assistance (ODA).
  - For Sub-Saharan Africa, annual adaptation cost estimated to be $14-17 billion

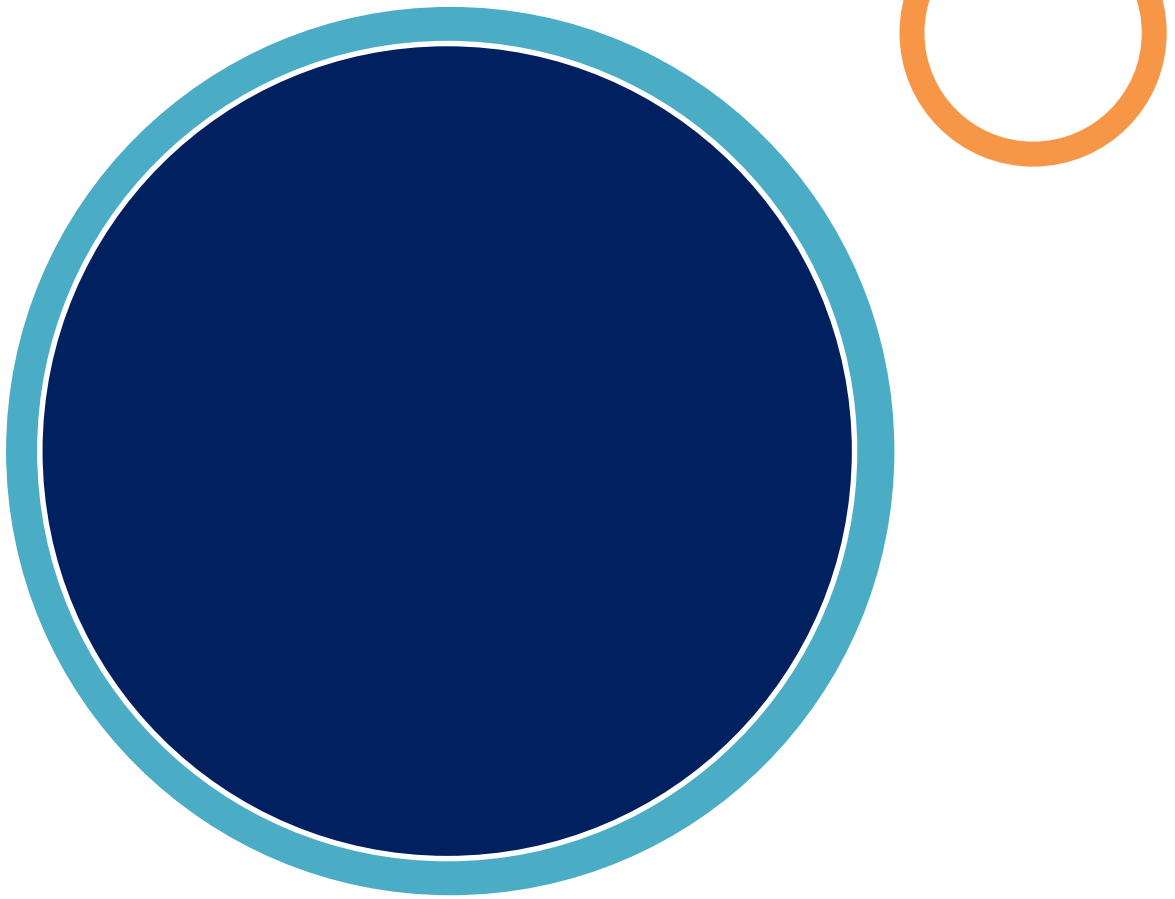
Why is Climate Proofing Investments Necessary?

- Study found that:
  - There is need to invest in human capital, develop institutions, and avoid incentives that encourage development in locations exposed to severe weather risks.
  - Adaptation will require a different kind of development—such as breeding crops that are drought and flood tolerant, climate proofing long-lived infrastructure to make it resilient to climate risks.
  - For example, in Mozambique, there is need to look at ports like Beira and make sure it is climate-proofed.

Why is Climate Proofing Investments Necessary?

- Start with actions that make sense even without climate change:
  - All over Africa, studies show that expanding the road system and increasing the share of paved roads would yield high return by lowering transport costs and expanding markets.
  - They lessen flood impacts and enhance farmers' ability to respond on changes in agriculture.

PART 7: MAINSTREAMING CLIMATE INFORMATION AND SERVICES INTO LAWS, PLANS AND POLICIES



Mainstreaming Climate Information And Services Into Laws, Plans And Policies

- This section contains the following sub-headings:
  - Approaches to Mainstreaming
  - (Intended Nationally Determined Contributions) INDCs as a Mechanism for Climate Change Mainstreaming
  - Steps to Climate Mainstreaming
  - Integrating climate information into new climate sensitive laws
  - Challenges facing climate change mainstreaming and way forward and Evaluating effectiveness

Approaches to Mainstreaming

- Mainstreaming is defined as:
- a means that development policies, projects/programmes and/or individual actions that otherwise would not have taken Climate Change mitigation and adaptation into consideration explicitly include these when making development choices

- Can be used interchangeably with “integration”.

- Requires understanding of the local context in-terms of climate and non-climate drivers, existing policies, decision-making process, ancillary costs and benefits

Approaches to Mainstreaming

- Climate Change mainstreaming takes place at three levels of intervention:
  - **Strengthening the development base:** Deliberately implement development initiatives that aim to reduce vulnerability (not necessarily to climate change).
  - **Promoting mainstream adaptation measures:** Incorporate Climate Change into government decision-making: by mainstreaming in legislative frameworks resulting in (a) climate proof policies and (b) addressing emerging adaptation needs.
  - **Promoting specific adaptation measures:** Address issues that have not been tackled by the two levels above though enacting specific adaptation policy measures.

Approaches to Mainstreaming

3 levels of Climate Change mainstreaming interventions:

Strengthening the development base

- Deliberately implement development initiatives that aim to reduce vulnerability (not necessarily to Climate Change).

Promoting mainstream adaptation measures

- Incorporate Climate Change into government decision-making: Mainstreaming in legislative frameworks resulting in (a) climate proof policies and (b) addressing emerging adaptation needs.

Promoting specific adaptation measures

- Address issues that have not been tackled by the two levels above though enacting specific adaptation policy measures.

Approaches to Mainstreaming

The following general approaches can be adopted when mainstreaming climate change into developmental policies

- Climate Proofing Approach
- Climate First Approach
- Development First Approach

The Climate Proofing Approach

- Targets climate-proofing development initiatives that have been planned without considering Climate Change and variability.
  - Done by increasing capacity to cope and recover from effects of climate change and variability.
  - Suitable for nations that use project-based approaches to development planning: entry point is project based intervention
  - An example is the USAID which aims to integrate climate resilience into the design of its country assistance development portfolio.

The Climate First Approach

Seeks to increase a society's ability to cope with effects of Climate Change and variability.

Entry point is stand-alone Climate Change policies/strategies.

- Examples are provided in:
  - Initial National Adaptation Programmes of Action (NAPA)
  - Pilot Program for Climate Resilience (PPCR) guidance documents, which allow Least Developed Countries (LDCs) to identify priority activities and projects that responded to their urgent and immediate climate adaptation needs.

Development First Approach

- Ensures climate resilience is incorporated in all development initiatives – from decision making to implementation to the outcome of the development initiative.

- Entry point for integration is often a national, local or sectoral development planning framework.

INDCs as a Mechanism for CC Mainstreaming

- Expected to guide national development and planning hence a road map towards a sustainable future.
- Paint a picture of current measures being undertaken to address climate change issues hence build resilience
- Majority of United Nations Conference on Climate Change (UNFCCC) member countries provide mainstreaming Climate Change adaptation into national planning and development as a means of addressing Climate Change nationally.

Guidance on Climate Change Mainstreaming

- UNDP -UNEP PEI Climate Change Mainstreaming Guide is built on three components:

  – Finding the entry points and building the case

  – Mainstreaming climate change adaptation into policy processes

UNDP -UNEP PEI Climate Change Mainstreaming Guide

- **Finding the entry points and making the case**:
  - understanding institutional and regulatory frameworks governing national development priorities
  - understanding linkages between Climate change and development priorities
  - Understanding the social, economic and political contexts

UNDP -UNEP PEI Climate Change Mainstreaming Guide

- **Mainstreaming climate change adaptation into policy processes:**
  - Seeks to integrate climate change adaptation issues into on-going policy processes e.g., National Development Plans and Strategies.
  - Findings from country specific research studies such as vulnerability Impact Assessments and Socio-economic studies can generate information that can be mainstreamed into current legislature

Steps to Climate Change Mainstreaming

- General steps undertaken to mainstream climate change into Rwanda's tea and coffee sectors are discussed below:-
  - Identify entry points, stakeholders and engage
  - Assess the context
  - Assess climate information and risks
  - Identify, sequence and prioritise adaptation options
  - Climate financing
  - Programme, implement and address the barriers

Identification of Entry Points

- Defining key entry points, is a key step in the process of mainstreaming.
- Involves identifying opportunities at the national, local, sector or project planning process where climate aspects can be integrated.
- This is done by:
  - Undertaking policy analyses to establish entry points
  - Stakeholder consultation

Examples of Policy Entry Points

	Planning Level	Entry Point
1	National government and cross sector ministries	• National Development Vision (Long-term) • Poverty Reduction Strategy • National Development Plan (E.G. 5 Year) • National Budget Allocation Process Or Review • SDG-based National Development Strategy
2	Sector Ministries	• Sector Development Plans, Strategies, Policies • Sector Master Plans • Sector Budgets • Public Expenditure Reviews
3	Subnational Authorities	• Decentralisation Plans • District Plans • Subnational Budgets
4	Projects	• Environment Safeguards (E.G. EIA) • Climate Safeguards (E.G. AFDB) • • Project Design Guidelines

Assess the Context

- Understanding of the local context including key problems and priority issues for the development area is necessary.
- Selected problems to be addressed should be in line with priority issues of the development area
- Urgency of the problem and its magnitude should be considered when selecting the issues to address

Assess Climate Information and Risks

- An iterative approach should be adopted
- An assessment of current climate variability and projection of future climate with emphasis on capturing uncertainty should be undertaken .
- Differs from standard assessments because a comprehensive interpretation of climate products by climate modelling experts is made for inclusion in decision making analysis.

Identify, Sequence and Prioritise Adaptation Options

- Adaptation options will be identified and prioritized iteratively with climate and risk information.
- Analysis ensures that:
  - Options can be justified
  - Use of available resources is maximized
  - Cost analysis for project implementation is built
  - Includes analysis of costs and benefits of early low regret options including the value of information for capacity building and research
  - Includes analysis of options that can be introduced during design or planning phase

Climate Finance

- It is important to demonstrate how options from analysis will be financed.
- Includes development of a proposal that will cost the options and identify a potential source of finance such as:
  - Climate funds such as the Green Climate Fund
  - Bilateral/ Multilateral development partners such as African Development Bank (AfDB)
  - Domestic budgeting such as National Climate Change Funds

Programme, Implement and Address the Barriers

- This step will involve clearly indicating:

  – How the options will be implemented
  – Who will be responsible for what and when,
  – The implementation approach
  – Financial flow
  – Project management
  – Potential barriers and how they will be addressed
  – Monitoring and Evaluation

❖ Clear work plans, log-frames, and milestones should be provided.

Integrating Climate Information into New Climate Sensitive Laws

- With regard to integrating Climate Change into legislature, 4th Intergovernmental Panel on Climate Change IPCC Report highlights:-
  - Sustainable development can be achieved if Climate Change policies are integrated with other development policies
  - There is need to ensure that integration of Climate Change into policies is tailored to respond to local context
  - Selected instruments for Climate Change mainstreaming should be updated over time in-order to improve effectiveness
  - Continuous Monitoring & Evaluation of these instruments should be undertaken.

Tools for Mainstreaming Climate Change Actions

Regulations and Standards:	Bench-mark emission levels by e.g., providing the minimum requirement for pollution output, set technology standards etc.
Taxes and charges:	Fine/levy imposed to a source for an undesirable activity.
Tradable Permits/Marketable permits/Cap-and-Trade systems:	“Establishes a limit on aggregate emissions by specified sources, requires each source to hold permits equal to its actual emissions and allows permits to be traded among sources”

Tools for Mainstreaming Climate Change Actions

Voluntary Agreements (VAs):	Agreements made between government and private parties to promote environmental integrity. Some include rewards/ penalties for participation in agreement or achieving commitments.
Subsidies and Incentives:	Rewards given by the government to an entity for undertaking a specific action, including direct payments, tax reductions, price supports or the equivalent.
Information Instruments:	Obligation to publicly disclose information relating to environmental matters e.g., labelling programmes and rating and certification systems.
RE Feed-in Tariffs (FIT):	Policy instrument to catalyze investment in renewable energy technologies through offering long term contracts to RE producers based on the generation cost of each technology.

Examples of Policies, Measures and Instruments used for Climate Change Mitigation

Sector	Policies , Measures And Instruments Shown To Be Environmentally Effective
Energy Supply	• Reduction of fossil fuel subsidies • Taxes or carbon charges on fossil fuels
Transport	• Mandatory fuel economy, biofuel blending and CO2 standards for road transport • Taxes on vehicle purchase, registration, motor fuels, road and parking pricing • Influence mobility needs through land use regulations, and infrastructure planning • Investment in good public transport facilities and non-motorised forms of transport
Agriculture	• Financial incentives and regulations for improved land management, maintaining soil carbon content, efficient use of fertilizers and irrigation
Forestry	• Financial incentives (national and international) to increase forest area, to reduce deforestation, and to maintain and manage forests • Land use regulation and enforcement

Key Challenges in Climate Change Mainstreaming

- **Climate Change is Complex**
- **Designated to a specific Ministry (Env)**
- **Challenge in implementing recommended policies**
- **Unclear links between national and sub-national plans**
- **Inadequate Institutional Capacity**
- **Difficult to prioritise actions due to long term and unpredictable nature**

Climate Change is Complex

- Addressing impacts of Climate Change cannot be done exclusive of development and poverty eradication:
  - Key bottleneck remains how to make Climate Change a relevant issue to the government and other development stakeholders.
  - Necessary to understand linkages between poverty reduction and pro-poor economic growth must be built.
  - Needs clear identification of potential economic costs of Climate Change impacts in a BAU scenario Verses when Climate Change adaptation is mainstreamed in development planning

Climate Change is Designated to Single Ministry

Climate Change matters are usually designated to the Ministry of Environment:

- Minimal attention is given by Governments during national development planning and budget allocation.
- Involving key ministry such as Finance and Planning in mainstreaming of Climate Change adaptation improves effectiveness
- This ensures budget allocation for Climate Change mainstreaming across sectors and development planning.

Challenges in Implementing Recommended Policies

- Financing and measuring the impact of policy measures remains a key challenge – In this case, policies that have successfully integrated climate aspects.

- Outcomes of policies are usually felt after a period of time hence persistence is key to overcoming the policy implementation challenge.

Unclear links between National and Sub-National Plans

- Lack of a clear link between National responses and other sub-national levels:
  - Need to link national responses with local and grass root levels.
  - In addition, need to scale down national projections to area specific.
  - Requires active involvement of stakeholders from all levels and economic sectors.

Inadequate Institutional Capacity

- Inadequate capacities of institutions at various levels impede policy implementation including limited technical know-how & limited funds
  - Need to sustainably strengthen capacities of institutions including Climate Change advocacy, increasing number of technical experts, increasing budget allocation etc.
  - Making mainstreaming a standard practice across sectors ensures sustainability of this initiative.
  - This can be done through integrating Climate Information into sector mandates, coordination mechanisms, and procedures.

Difficult to Prioritise Actions due to Long Term and Unpredictable Nature

- Climate Change is a long-term issue, but political leaders and government officials find it difficult prioritizing it due to unpredictable nature.
  - Addressing Climate Change requires managing risks and making decisions based on “considerable uncertainty, with limited and/or imperfect information”.
  - Contradicts with short term political and government priorities aligned with political cycles
  - Need to ensure political will through widespread advocacy and packaging Climate
  - Information in a manner that is easy to interpret and responds to the needs of political leaders e.g., short term and long term

Evaluating Effectiveness

- Finding the Entry Points and Making the Case
- Long Term Outcomes
- Meeting the Implementation Challenge
- Mainstreaming CC Adaptation into Policy Processes

Checklist of Climate Change Adaptation Mainstreaming

Finding Entry Points and Making the Case

- checklist:

1. Unanimous agreement on the entry points for adaptation mainstreaming and a complete work plan that provides the road map for upcoming activities

2. Formulate adaptation mainstreaming steering committee/ task force – with stakeholders from government, community and private sector relevant to entry points

3. Adaptation mainstreaming champions liaising with in-country donor coordination mechanisms

4. Increased Climate Change advocacy e.g., poverty increases vulnerability to climate change; climate change impacts on key socio-economic sectors affects national economic development hence increases national vulnerability etc.

5. Develop a work plan that clearly identifies activities to be implemented in collaboration with finance and planning or relevant sector ministries – for the next stage

Mainstreaming CC Adaptation into Policy Processes

- checklist:

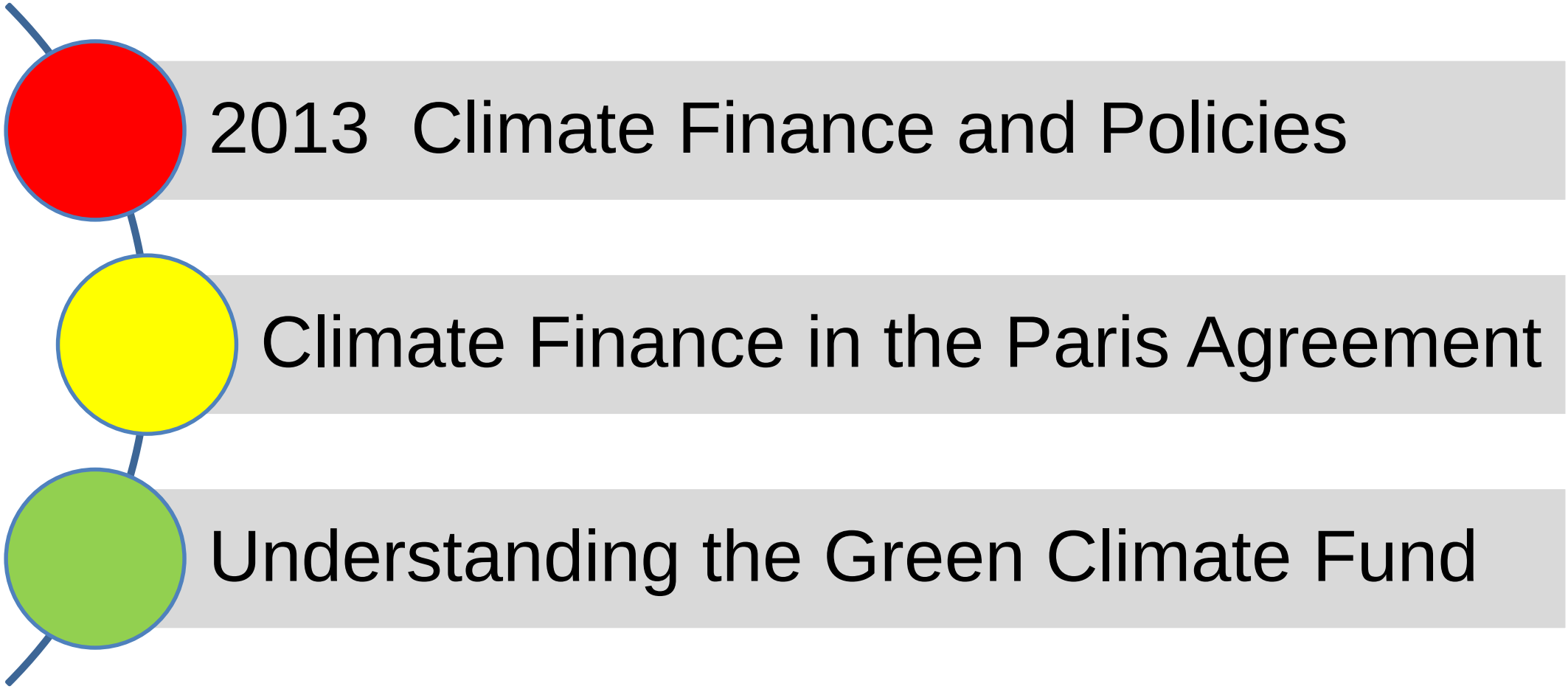
1. Provide country specific evidence on economic costs of CC and benefits of climate change and adaptation.(Impact, vulnerability and adaptation assessments, socio-economic analysis, & demonstration projects).
2. Working documents produced during the targeted policy process should also include information on the link between: Adaptation – Development - Poverty Reduction
3. Adaptation and links to development and poverty reduction should be included as a priority in the completed policy documents of the targeted policy process
4. Climate-proofed and specific adaptation policy measures for climate change adaptation costed by finance and planning or sector ministries and subnational bodies

Meeting the Implementation Challenge

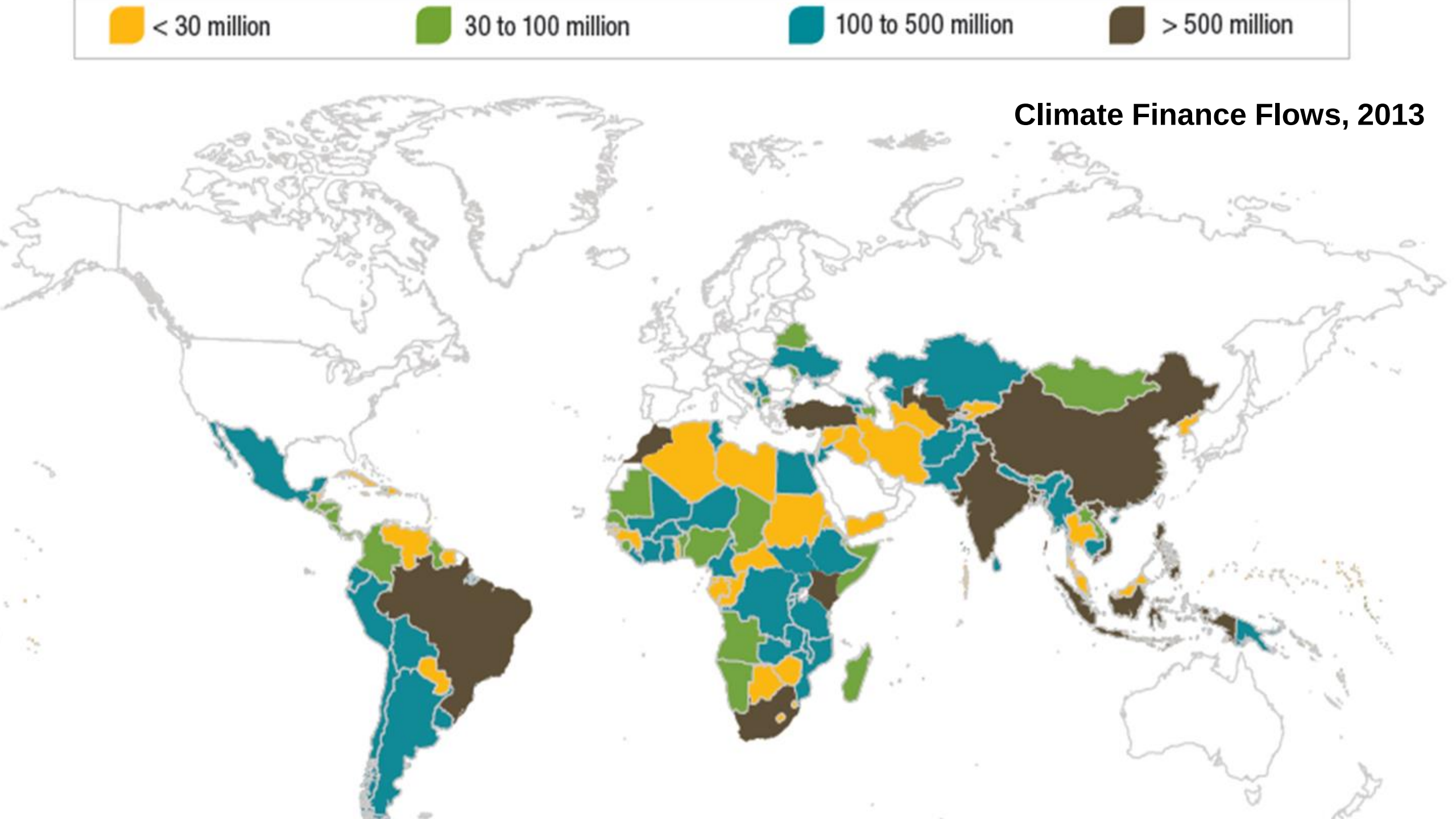
- Checklist:
  - Adaptation-related indicators linked to policy documents of national development planning integrated in the national monitoring system
  - Increased budget allocations and public expenditures for adaptation policy measures of non-environment ministries and sub national bodies
  - Government and administrative procedures adopt adaptation mainstreaming as a standard practice

Long Term Outcomes

- Strengthened institutional capacities for long-term adaptation mainstreaming
- Enhanced conditions for simultaneous improvement of adaptation and poverty reduction


2013 Climate Finance and Policies
Climate Finance in the Paris Agreement
Understanding the Green Climate Fund

Climate Finance Flows, 2013

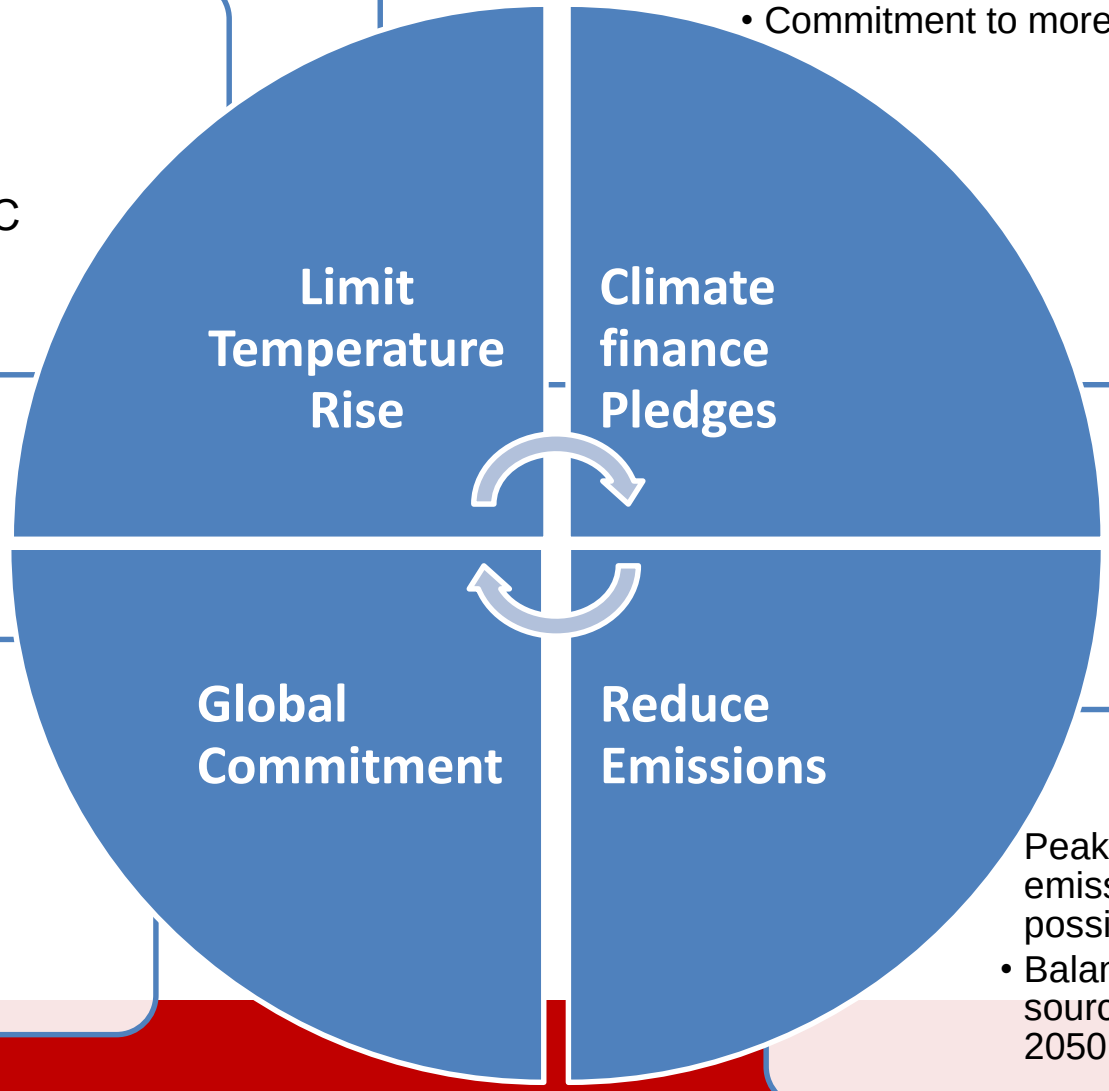


Climate finance in the paris climate agreement

Key Highlights of the Paris Agreement

- Keep global temperature increase "well below" 2˚C
- Try limit it to 1.5˚C

- $100 billion a year pledged by 2020
- Commitment to more in the future



- review each country's contribution to cutting emissions
- Scale up every 5 years

Peak greenhouse gas emissions as soon as possible
- Balance between GHG sources and sinks by 2050

Key Intended Outcomes

- Outcome of the Paris Agreement is to ensure funds flows towards reducing GHG emissions and climate resilient development.
- It is the first time countries have collectively agreed to this

Climate Finance in the Paris Agreement

D**eveloped countries** are:

- **Legally bound** to provide support to developing nations in continuation of existing obligations under the Convention.
  - Progression beyond current efforts, intend to continue $100 billion, to be increased from 2025
- Other Richer countries eg Brazil, are encouraged to provide financial support voluntarily

Climate Finance in the Paris Agreement

- Developed countries are obliged to take lead in **mobilizing climate finance** from a variety of sources, instruments and channels
- Legally bound to provide transparent and consistent information on support for developing countries

Climate Finance in the Paris Agreement

Funds should promote **climate change legal and legislative frameworks, both mitigation and adaptation** for developing countries:

- GCF and GEF will operate Convention's Financial Mechanism
- LDC Fund and Special Climate Change Fund, (GEF) shall also serve the Agreement.
- Adaptation Fund may serve the Agreement

The green climate fund

What is the Green Climate Fund (GCF)?

- GCF is a fund within UNFCCC Framework as a mechanism to assist developing countries in **adaptation and mitigation practices** to counter climate change.
  - Formally established during the COP 16 in Cancun, Mexico (2010)
  - Governing instrument adopted at COP 17 in Durban, South Africa.
  - Became fully operational in 2015
  - Approved USD 168 million for its first eight projects in 2015

What is the Green Climate Fund?

- Aims to make an ambitious contribution to attaining the mitigation and adaptation goals of the international community.
- Intended to be the centerpiece of efforts to raise Climate Finance of $100 billion a year by 2020.

Private Sector Facility of GCF

- Created to mainstream climate change mitigation and adaptation actions in the private sector.
- Accredited entities with private sector operations; present funding proposals spontaneously or in response to calls for proposals
- Possible interventions:
  - Fund climate risk assessment models and tools
  - Long-term debt, credit lines and refinancing
  - Equity to develop a project to full bankability
  - Guarantees to bear specific risks

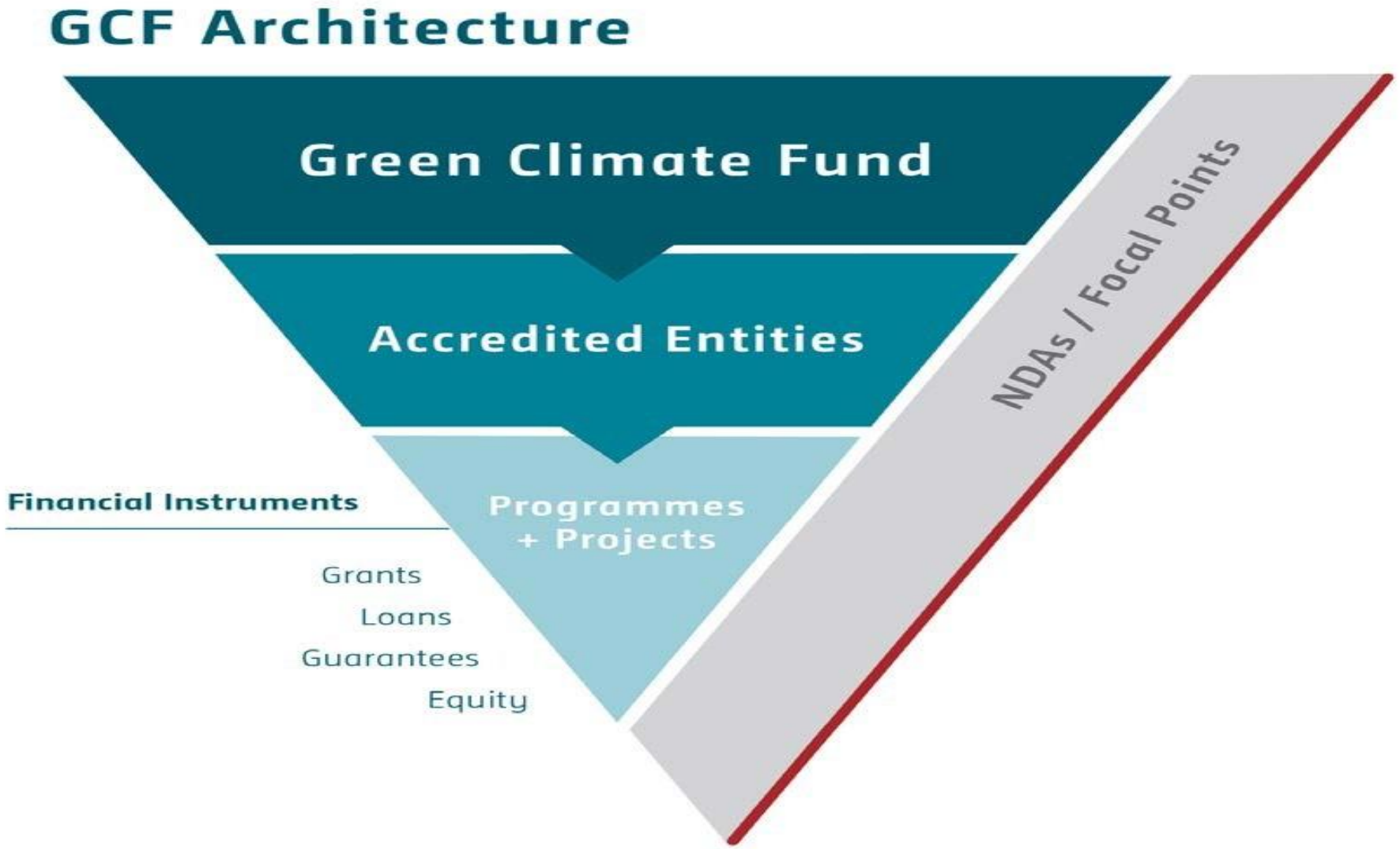
GCF's Added Value

- Country ownership through National Designated Authorities / focal points
- Balance between adaptation and mitigation
- Equal voice for developed and developing countries
- Diversity of accredited entities
- Diversity of financial instruments
- Dedicated Private Sector Facility (PSF)
- Largest dedicated climate fund globally

GCF Structure

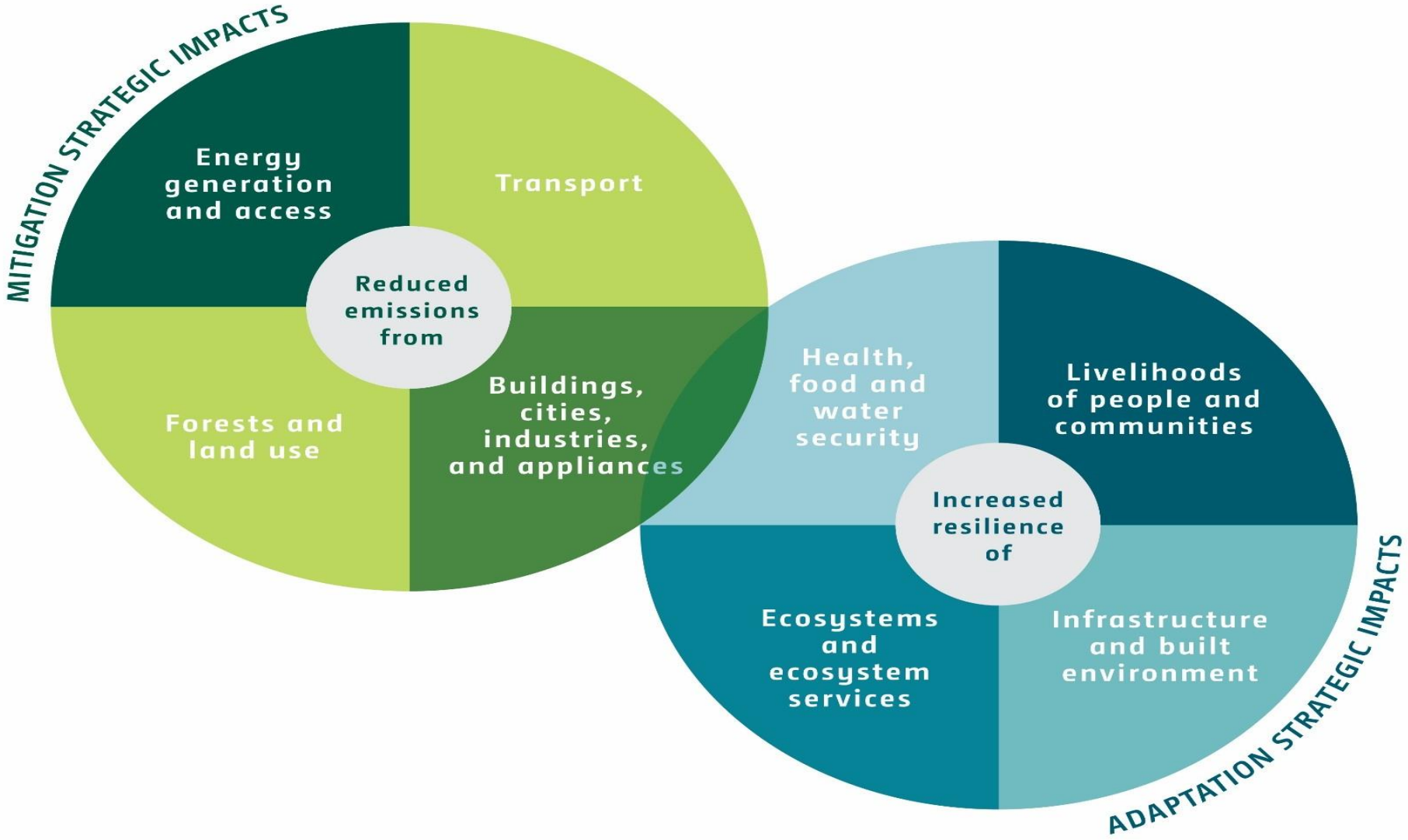
- Legally independent, with own secretariat and the World Bank as its interim trustee:
  - 24 Board members, with equal representation of developed and developing countries
  - Guided and accountable to the UNFCCC
  - Committed to balancing spending between mitigation and adaptation.
  - Committed to spending 50% of its funding on adaptation, of which 50% is to be spent in LDCs, SIDs and African States.

GCF Architecture



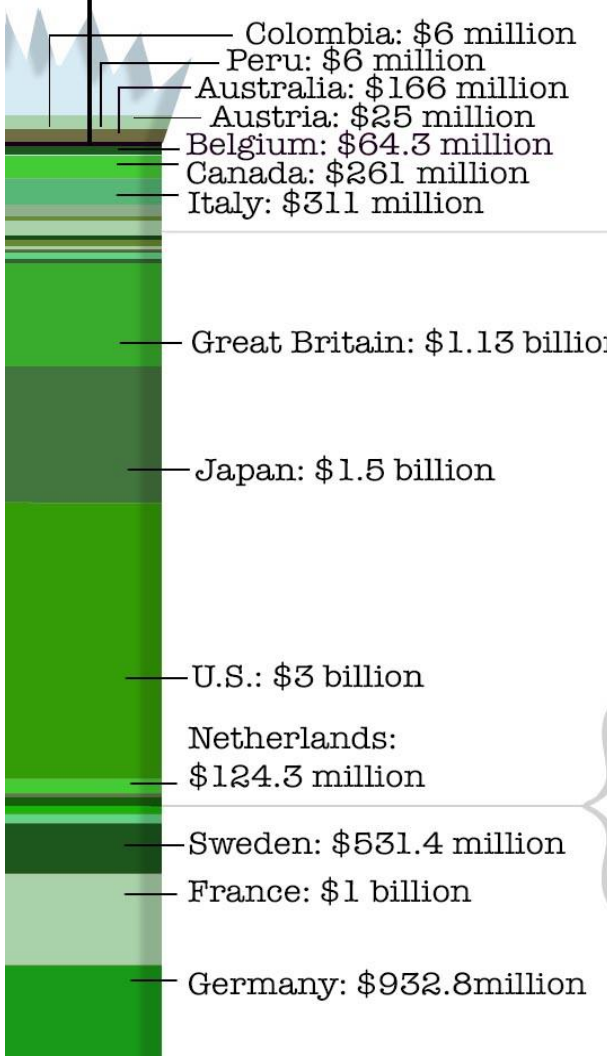
GCF Strategic Impacts

GREEN CLIMATE FUND



THE GREEN CLIMATE FUND

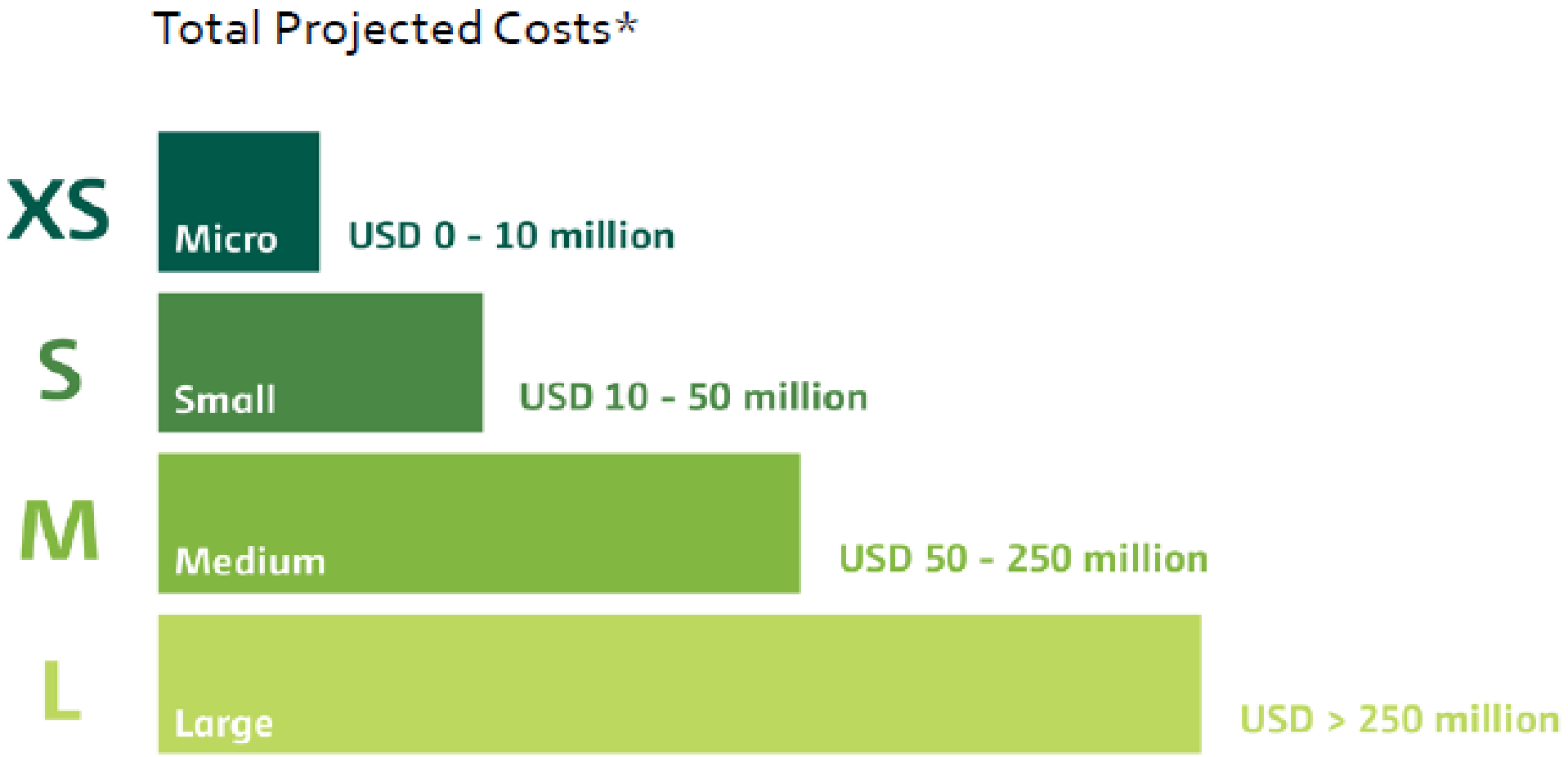
GOAL REACHED: $10 BILLION



Norway: $223 million
Finland: $100 million
Spain: $150 million
New Zealand: $2.34 million
Panama: $1 million
Monaco: $0.25 million
Mongolia: $0.05 million
Liechtenstein: $0.05 million

Czech Republic: $5.5 million
Luxembourg: $6.22 million
Mexico: $10 million
Denmark: $66.9 million
South Korea: $100 million
Switzerland: $100 million
Indonesia: $0.25 million

Project Size and Funding Costs



* At the time of application, irrespective of the portion that is funded by the GCF and, if applicable, other sources, for an individual project or activity within a programme.

THE END

- THANK YOU FOR YOUR KIND ATTENTION

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