

WISER project closing workshop
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**Utilization of World Meteorological
Organization mandated data sharing
protocols in Africa**

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I/ Introduction

□ The need for CIS

➡ **African continent: climate change hot spot where increased hazards probability, vulnerability and exposure meet: climate risk is high**

➡ **Recent studies:**

- Unusual heatwaves has become normal
- Droughts and flood have become more common
- Challenge human and natural systems

Human live and countries' economy are at stake

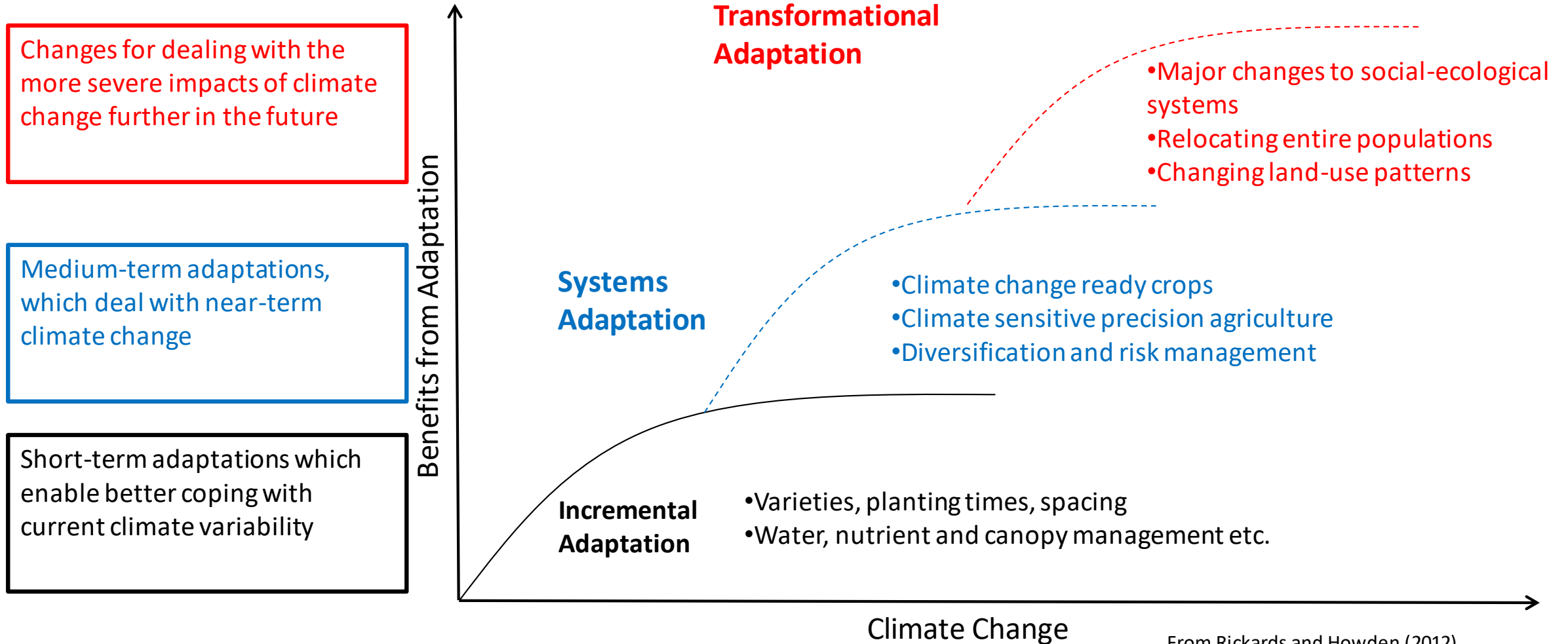


➡ **African countries must respond and tackle the adverse impacts of climate change --- adaptation, disaster risk reduction**

❖ **Need for acquiring climate information to support resilient development**

I/ Introduction ...

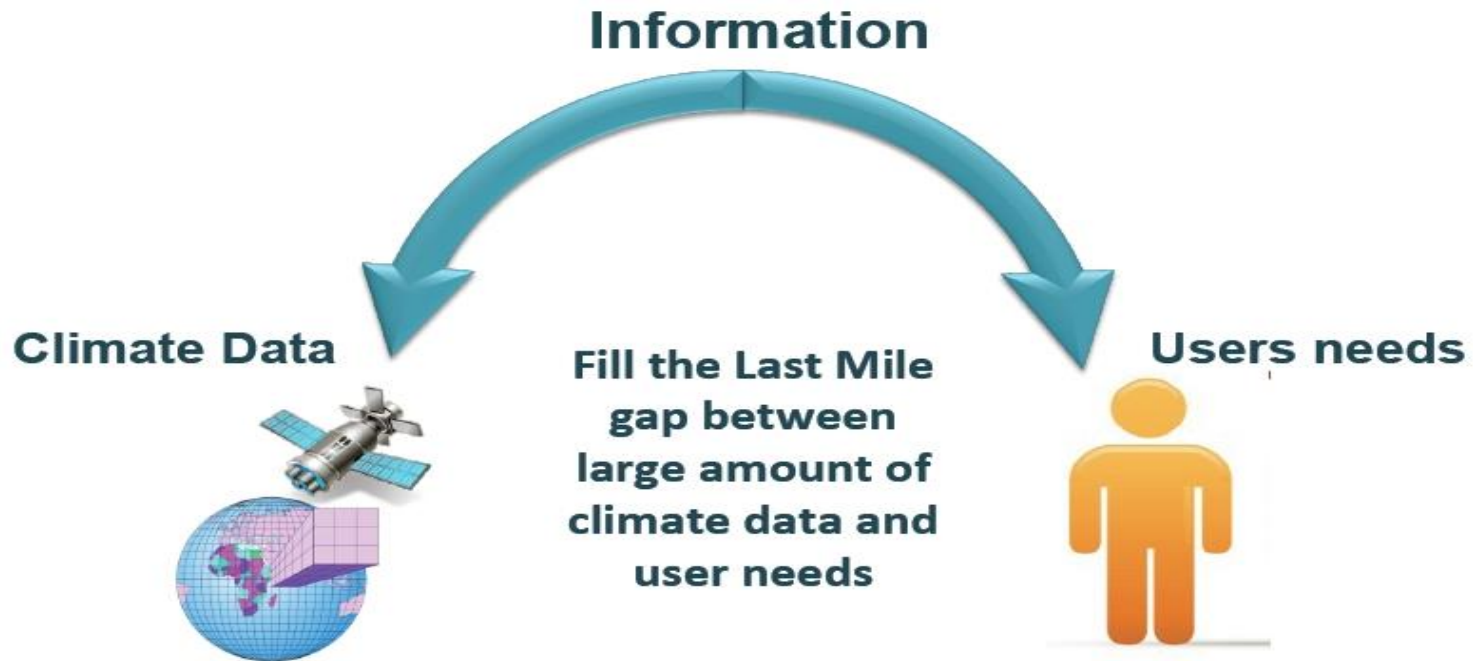
❖ Climate change information needed for adaptation



From Rickards and Howden (2012)

I/ Introduction ...

- ➔ **Climate service involves the generation, packaging and delivery of climate information and its subsequent uptake by users**



- ❖ CIS can describe historical, current and future weather and climate conditions and can entail future predictions on daily, monthly, seasonal or decadal timescales and projections

I/ Introduction ...

□ The need for data sharing

- ❖ CIS providers: Governmental technical institutions (met/hydro service), civil societies, NGOs, research and/or service centers, private sectors ...
- ❖ Monitoring and forecasting of severe weather: mesoscale disturbance – data/information needed beyond the national boundaries
- ❖ Develop and refine tools and/or methodologies to better understand weather and climate and to produce reliable information – from historical to near real-time data are needed from the NMHSs
- ❖ CIS providers can get data/information and add value (knowledge and expertise) – for specific users
 - ➡ **Data sharing standards and procedures: between the different member countries and between members, regional research centers and others non-governmental companies.**

I/ Introduction ...

□ Example of data sharing protocols

- WMO resolution 40 (Cg-XII, 1995)
- WMO resolution 25 (Cg-XIII, 1999)
- WMO resolution 60 (Cg-XVII, 2015)



WMO members

➡ **Countries: NMHSs (leading role), other national agencies that measure data. What about intergovernmental organizations/institutes?**



Different data sharing protocols can co-exist: ICPAC, AGRHYMET, WASCAL, SADC, ACMAD

II/ Objective and Methodology

□ General objective: Review the WMO Resolution 40

- Review the application of the resolution
- Identify best practices and success stories
- Highlight barriers to data sharing
- And ultimately provide recommendations to promote their use to support CIS uptake in the African continent

□ Methodology

- Surveys and interviews
- Formal and informal discussions during meetings/workshops (i.e. Knowledge exchange workshop, ACPC, WMO, ICPAC, AGRHYMET, IPCC, etc.)
- Web search to acquire supplemental information (e.g. on the RCOF)
- Personal background and experience (as coordinator of observation network and most of these were discussed with met and hydro services)

III/ WMO Resolution 40

- All members (primarily NMHSs) shall provide on a free and unrestricted basis essential data and products required to describe and forecast accurately weather and climate necessary for the provision of services in support to protection of life, property etc...
- These essential : minimum set at the annex 1 includes surface synoptic data, all available in situ observations from the marine environment and all reports from the network of stations recommended by the regional associations (i.e. Africa, Asia, South America, North and Central America, South-West Pacific and Europe)
- Satellite data: concerns those data and products from operational meteorological satellites that are agreed between WMO and satellite operators and necessary for operations regarding severe weather warnings. These satellite operators can be public entities, private sectors and/or intergovernmental agencies.

III/ WMO Resolution 40 ...

- Free and unrestricted is here defined as non-discriminatory and without charge.
- Without charge refers to avoid charging for the data and products themselves, and to limit charges to the cost of reproduction and delivery.
- Same conditions apply for the provision of data to the research and education communities (researchers, teachers and students in academic and research institutions) for their non-commercial activities
- Additional data: subject to other conditions – charges may occur

IV Application of the resolution

□ **Application:** members send every 3-hours data from key stations to the WMO system and provide data on request to users

□ **Some considerations**

- No legal mandate that requires the members to comply with the resolution
- No consistent application of the resolution among members
- “All available” means that the data provider can make them available (or not) under this resolution
- The resolution recognizes “the right of Governments to choose the manner by, and the extent to, which they make data and products available domestically or for international exchange” → the members can deny access to their data for any reasons
- The resolution highlights the distinction between **essential** and **additional** data (see report)
- The member has the possibility to define which of their data are made available under **essential data** (as only a minimum is explicitly suggested) and which set is **additional data**

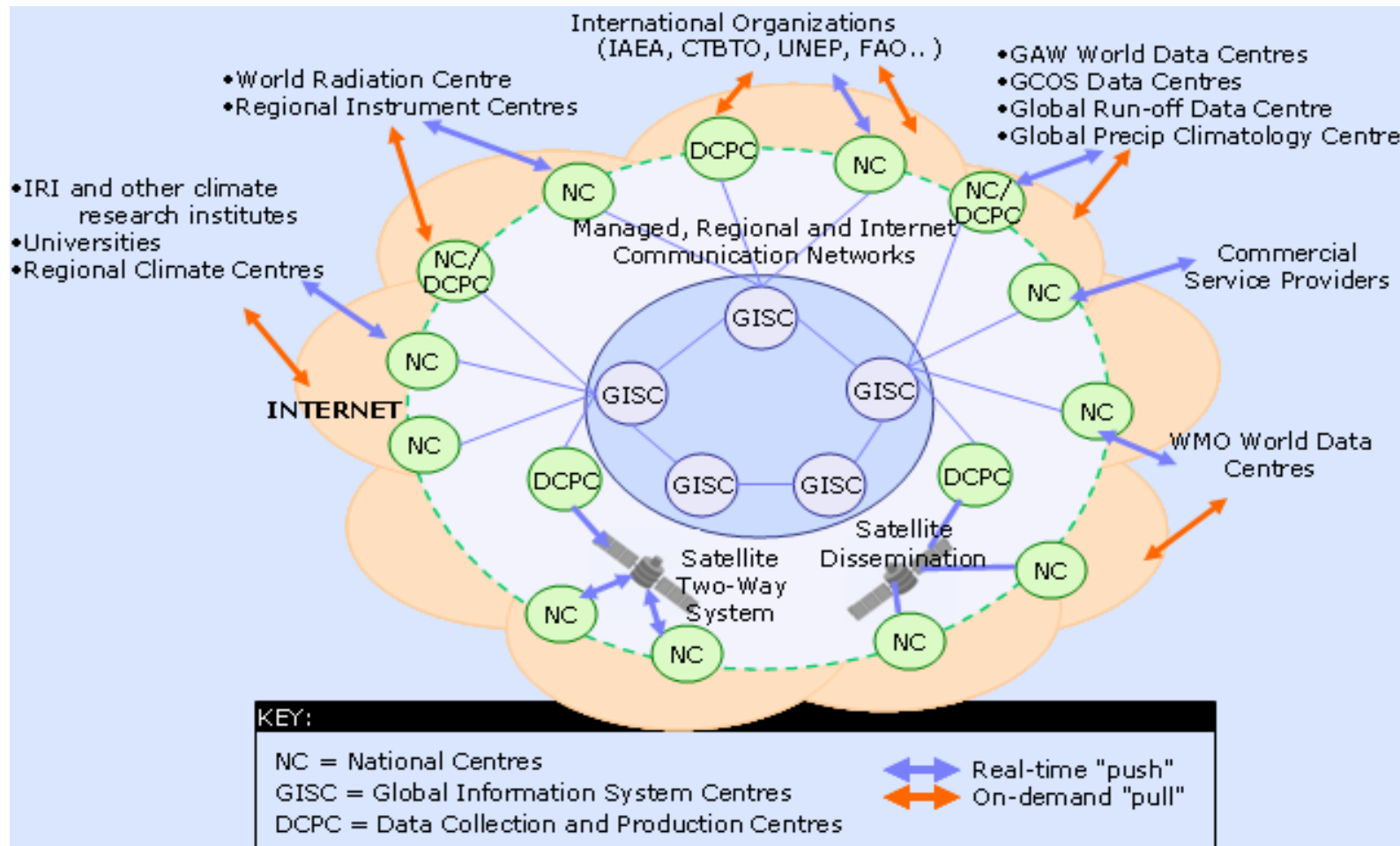
□ **Consequences**

- The application of resolution depends on the member’s willingness
- Members favoring unrestricted and free of charge access declared all their data essential
- Others with more restricted policies, allow commercial distribution of some data of their choice (termed as additional) while declaring other data as essential
- Unfortunate effect: the focus for charging for the data

IV Best practices / success stories

□ Continental level: the WMO WIS system

➡ WIS is a coordinated global system of telecommunication and data management facilities designed for routine collection and automated dissemination of observed data and products



- Common information exchange standards, functions and services for all WMO programs
- Interdisciplinary discovery, retrieval and exchange of information in real time and non-real time
- Interoperability through online catalogues using metadata

African GISC: Casablanca
African DCPC: ACMAD, AGRHYMET, ICPAC, etc.

IV Best practices / success stories ...

□ Regional level

❖ The regional data repositories

- ICPAC, SADC-CSC, AGRHYMET, NARCC
- Acquire climate and remotely sensed data
- Quality control and process the data to develop basic statistics including climatological baseline and extreme events occurrences
- Monitor, predict and provide early warning information about high impact weather events over the region
- Develop tools and maintain national and regional databases and information systems required to address vulnerability and risk reduction
- Ultimately support the climate resilient development of relevant sectors through research and applications
- Operates a data repository populated mostly by data from NMHSs and related enhanced data
- Data flows from and to both sides
- The policy is strengthened by the public support from head of states --- ease the sharing

IV Best practices / success stories ...

□ Regional level

❖ The regional climate outlook forums (RCOFs): 7

- AGRHYMET: the Regional Climate Outlook Forum for Sudano-Sahelian Africa (with a French acronym: PRESASS); the Regional Climate Outlook Forum for the Gulf Of Guinea Countries (with a French acronym: PRESAGG)
- ACMAD: the Southwest Indian Ocean Countries Climate Outlook Forum (SWIOCOF) that covers island countries in the southwest Indian Ocean and southern Africa adjacent countries; the Regional Climate Outlook Forum for Central Africa (With a French acronym: PRESAC)
- IPAC: The Greater Horn of Africa Climate Outlook Forum (GHACOF)
- SADC-CSC: Southern African Regional Climate Outlook Forum (SARCOF)
- NB: the Regional Climate Outlook Forum for Northern Africa (with a French acronym: PRESANORD) joined the South-East European Climate Outlook Forum (SEECOF) to form the Mediterranean Climate Outlook Forum (MedCOF), coordinated by the State Meteorological Agency of Spain (AEMET), with the contribution from ACMAD

➡ Each forum: NMHSs, RCCs, climate experts, representatives from the user sectors, private sector and the media meet, share their data, tools and methodologies, develop a consensus for the regional climate outlook, identify impacts and implications and formulate response strategies.

IV Best practices / success stories ...

□ National level

- NMS coordinate data sharing
- Good relationship and sharing experience with students, universities, research scientists
- Provide data on request subject to some conditions
- Collect, manage and share data, products and information during the implementation of a joint scientific project
- Coordinate data generation, data sharing, early warning system for the implementation of the countries disaster risk management plan

IV Barriers to data sharing

□ Strategic level

- **Absence of legal obligation in WMO resolution 40:** No legal bindings, the resolution is done by members and for members
- **Users malpractices and inappropriate data exchanges:** data acquisition conditions not respected, data published without consent, informally exchanged → lack of trust
- **National laws and legislation:** concerns about national security, nationalism and protectionism, conflict of interest
- **Cost recovery of the infrastructure:** lack of resources for the infrastructure maintenance, acquire funds to support the cost and control the competition with private sector

□ Operational level

- **Lack of human and technical resources:** Good connectivity is needed to access to someone's data and even to let someone access to your data, intermittent connection, data hub connection down, data supplied in real time only during the day
- **Data discovery, access and quality:** no clue about the existence of a particular data, semantics and meanings, access conditions, history, data locally stored and not published online
- **Data format and interoperability:** ASCII, Excel spreadsheet, CSV, GRIB and NetCDF (Network Common Data Form), paper records, microfiches. Excel and CSV format use different ways of reporting. GRIB and NetCDF cause issues of readability in other systems

IV Recommendations

□ Revision and improvement of the WMO resolution 40 and extension of the WIS system

- Get rid of the terms “essential”, “additional” or even “all available”
- Can be replaced by “all data currently collected or held”
- Alternatively: extent the list of minimum datasets including all those needed by the CIS community
- “Without charge” could refer to “free and open access”.
- Avoid charging for the data and products themselves, and to limit charges to the cost of fulfilling user requests (when it requires substantial processing)
- Include guidelines for pricing and timing
- Encourage data owners to make free and open access for non-profit research activities and non-profit climate service provisions
- WIS is a good model for data management, discovery and sharing
- Extent to all regional and national research or service centers that operates a weather observation network and/or provide climate services

IV Recommendations ...

□ Data providers and receivers engagement through a business model

1st business model: the data provider shares their data with the regional research center which in turn helps in further quality control, adds value to the data, strengthens the NMHS capacities to meet national climate information needs and ultimately acts as a data repository and back up.

2nd business model: focus on helping to reduce the costs of the infrastructure

→ Through third-party funding, the regional research center can provide equipment, help on the maintenance of the equipment and contribute to the quality control

→ Assist on data rescue and fund staffs training

→ Access to the data on an agreed frequency basis that could be near real-time, daily or monthly

3rd business model: joint and collaborative research and/or service proposals/projects

→ Funding agencies and planning organizations are further encouraged to fully recognize the data acquisition and management costs and support it

→ The regional research centers should be required to include the NMHSs of the region of interest in any research/service proposals

→ NHMSs Acquire some funds to run the infrastructure at least for the duration of the project

→ During the implementation phase of the project, the regional research centers should be granted full and open access to the data needed to achieve the objectives of the project

IV Recommendations ...

□ Harmonizing the technical aspects for data discovery and access

- The data must be discoverable and accessible by humans and/or machines
- It should be made available under uniform formats and quality-control standards, with uniform and comprehensive metadata detailing the characteristics of the data along with its history as well as clear requirements for its access
- It should be stored in ways that ensure long-term preservation and interoperability minimizing technological redundancy by using established national and international repositories
- Ideally, the datasets have to be published online in one website protected with a password through a common user interface
- Accessible via Internet and downloadable with File Transfer Protocol (FTP)
- Africa would benefit a lot in using one common data management system at the continental level and in capitalizing on CLIMSOFT

□ Strengthening of RCCs and policy coordination

- RCCs work very closely with NMHSs, and with users at RCOFs forums
- Need to be strengthened to provide the required technical data management and sharing support
- Communication between the RCOFs should be encouraged for methodologies and information sharing
- CR4D could be used for the policy coordination and knowledge exchange at the continental level

IV Recommendations ...

□ Creation of a data sharing institution/department

- **Not necessarily a new center:** a department within a coordination or operational center that has a continental mandate such as ACPC (through CR4D), ACMAD and/or the WMO regional office - dedicated for data sharing within Africa
- **The governing board:** Ideally, head of African states; alternatively, relevant ministries
 - Take the leadership for a public support of open access data
 - Establishing processes and mechanisms that mandate its effectiveness through legislation
 - Makes decisions on administration/finance and approves policies, regulations and guidelines
- **The institution/department**
 - Develops policies, regulations and guidelines to promote data sharing and enable open access
 - Prepare actions to be implemented, an annual budget and submit it to the board for approval
 - On a daily basis, it will oversee the data exchange activities based on approved modalities, regulations, guidelines, terms of reference, etc.
 - It must be empowered in such a way it can settle and resolve issues raised by a member through filed complaints regarding, for example, denied data requests from actors within Africa, misappropriate data acquisition, issues regarding traceability and license

IV Recommendations ...

□ Creation of a data sharing institution/department ...

- Key actions by the institution

- Identify all data owners, CIS tools developers (e.g. research centers, private sector), producers and providers within Africa, and their data access needs and gaps
- Identify their activities and classify them into commercial and non-commercial
- Define and create legal means to free the data of all charges for non-profit climate service tools development and information production.
- Define and create legal means to deal with data requests from the private sectors and other commercial activities
- Support to some extent countries' equipment maintenance and data collection
- Provide clearance for any projects coming to Africa

- The main actors/members:

- African governments is paramount for the leadership
- Relevant ministries will play a key role on identifying and prioritizing data needs and gaps
- NMHSs as they own most of the weather and climate data, traditional CIS producer/provider
- CIS producers and providers including the private sector, civil society, NGOs
- Research centers and universities that develop, test and refine the tools and methodologies required to generate CIS products

IV Recommendations ...

□ Creation of a data sharing institution/department ...

- Funding the institution

→ Seeks donors' commitment and secure funds on a regular basis (5 years)

→ To support countries' equipment maintenance and data collection

→ Ideally, it can operate core equipment (e.g. automatic weather stations in strategic locations within each country, satellite receivers and large servers) → data is open and free of any charges to CIS producers and providers – in collaboration with NMHSs

→ Make mandatory the inclusion of data management in all projects coming to Africa

→ Define a certain percentage to be included to the project budget and transferred to the institution

Thank you for your attention