



Climate Services Information System

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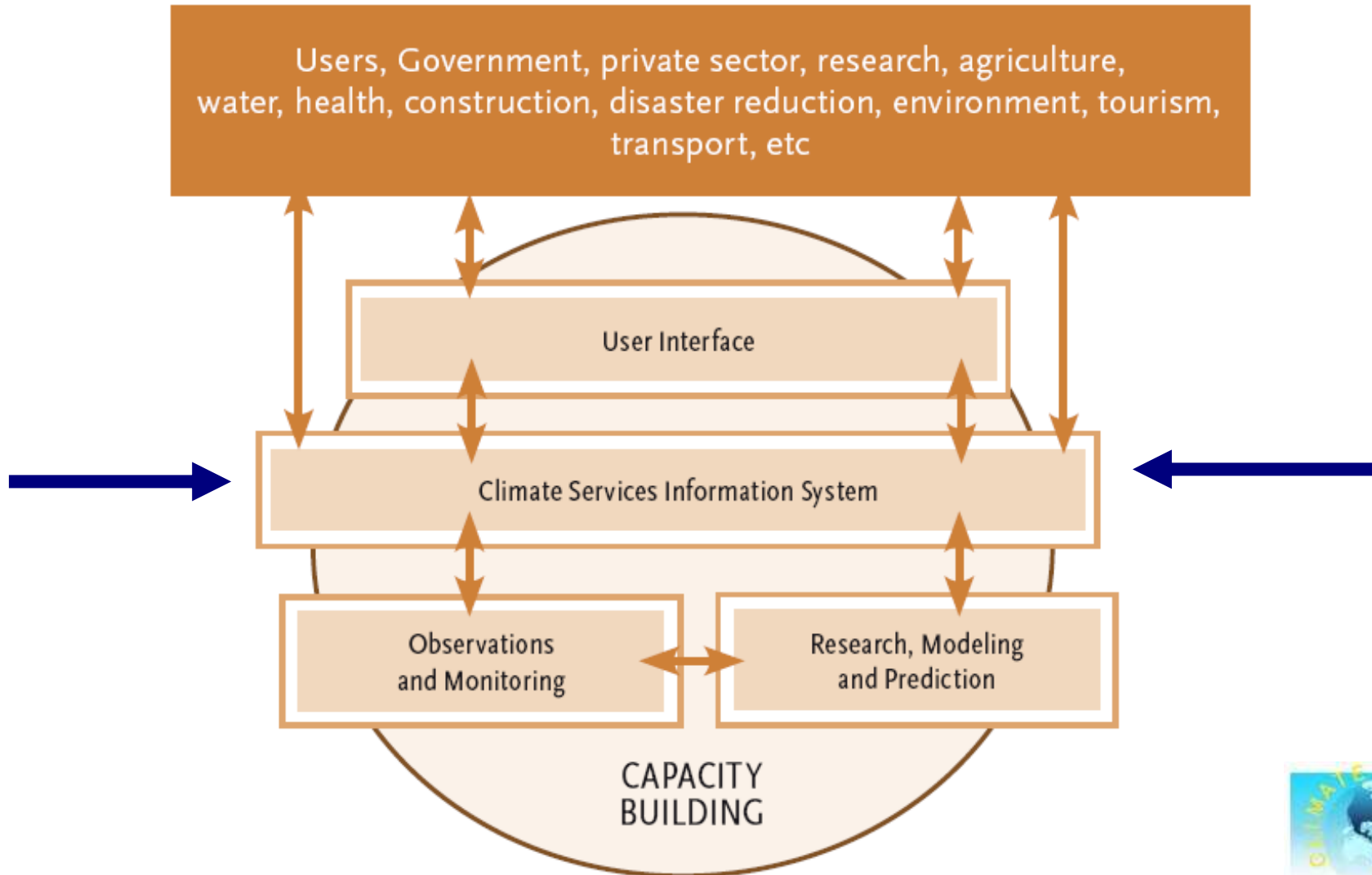


Global Framework for Climate Services

1. User Interface Platform
2. Climate Services Information System
3. Research, Modelling & Prediction
4. Observations & Monitoring
5. Capacity Building



Climate Services Information System



Climate Services Information System

■ Purpose

To collect, process and distribute climate data and information:

- a) according to the needs of users, and
- b) according to the procedures agreed by governments and other data providers.



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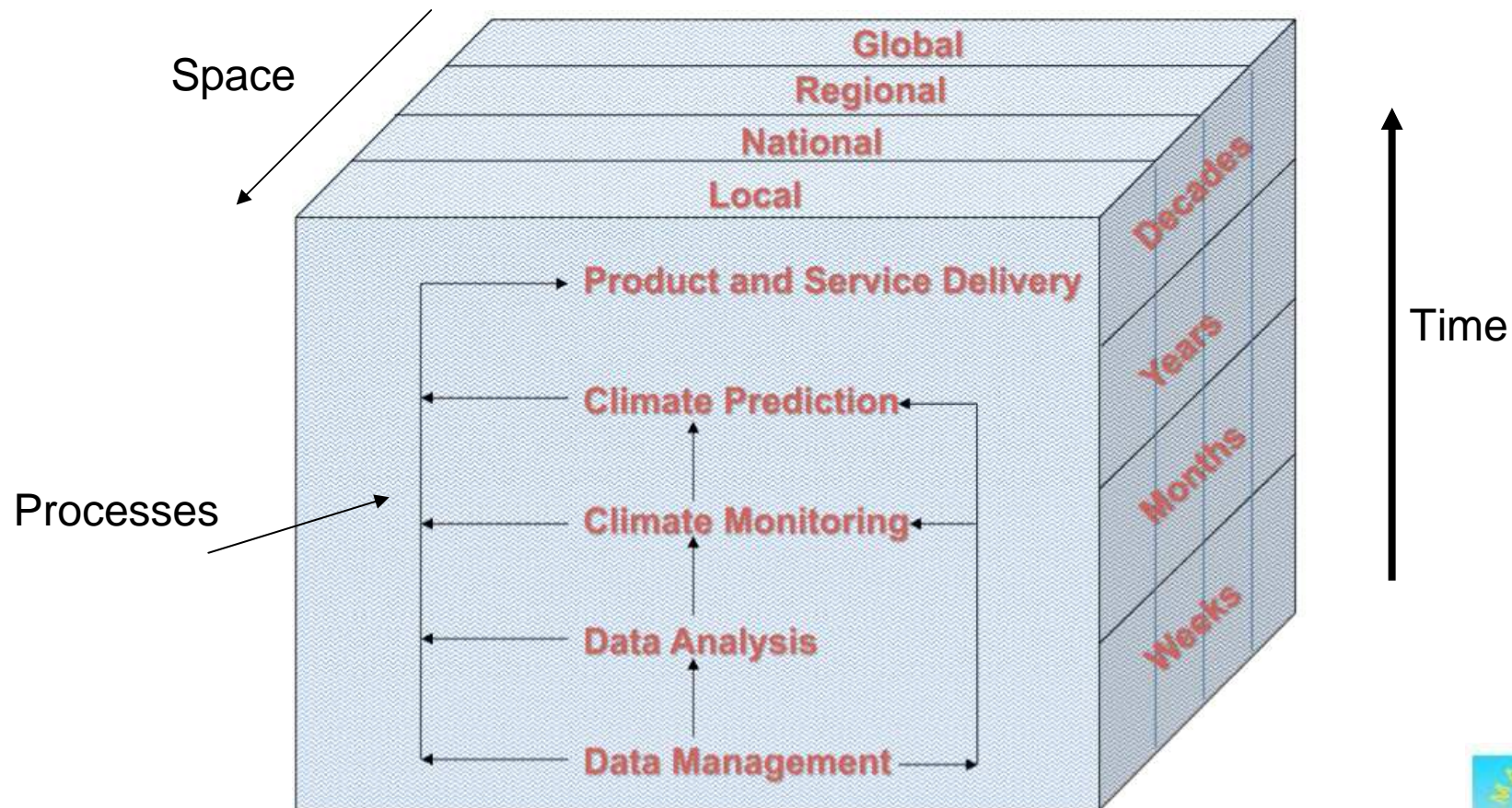
Implementation based on a 3-tiered network of collaborating institutions that will ensure climate information and products are generated:

- a) At a few key centres at a global level;
- b) At a finer scale through a network of regional “centres”; and
- c) At the national and local level by NMHSs and their partners through appropriate national institutional arrangements.



A Seamless System

- Three 'notions' of seamlessness:



Practicalities

Timescales

- Nowcasting – up to a few hours
- Weather forecasting – hours to around 10-15 days
- ~~■ Monthly predictions – two to eight weeks~~
- Seasonal predictions – three to six months
- Interannual predictions – six months to a decade
- Decadal predictions – one to three decades
- Climate projections – decades to a century or more



Seamless Prediction?

Prediction Problem	Nowcasting	Numerical Weather Prediction	Monthly Prediction	Seasonal Prediction	Decadal Prediction	Climate Change Projections	
Social, economic and environmental targets	Emergency response Fire weather Flash floods Safety of life	Emergency management Flood and storm warnings Irrigation scheduling Short-term planning	Emergency preparedness Water resource and crop management	Drought preparedness and management	Adaptation measures, Biodiversity and ecosystem conservation Resource development	Emissions reduction Strategic resource planning	
Drivers of variability and change	Fronts, Convection, Local storms	Fronts Large scale weather systems Cut off lows Tropical cyclones	30-60 day tropical oscillations Monsoons Southern Annular Mode Blocking	Tropical air/sea interactions: EL Niño Indian Ocean Dipole	Anthropogenic forcing Other predictable sources not known for Southern Hemisphere – likely include deep ocean circulation and possibly sea ice	Anthropogenic forcing on mean climate	
Time scale →	Hours	Days	Weeks	Months	Years	Decades	Centuries

Socio-economic

Scientific



Climate Services Information System

Requirements:

- A network of designated entities ^[1] providing global and regional-scale climate products and services in the domains of climate data, climate monitoring, long-range forecasting, interannual to decadal predictions and climate change projections;
- A minimum set of standardised products and a range of highly-recommended products, generated and distributed on the basis of agreed-upon operating principles;
- Access to and application of as much authoritative information as possible; and
- Capacity at the national level to access, process and convert global and regional climate information into national climate services.

[1] A 'designated' entity here is one that has formally been assessed and approved for carrying out functions and delivering products and services to standards set down in relevant WMO manuals such as that for the GDPFS.



Climate Services encompass a range of activities:

- the management of meteorological and related data collected primarily by NMHSs and also by other environmentally related organizations;
- the derivation of products from the data that describe the climate of a location, country, region or indeed the whole globe – past, present & future;
- the development of techniques for applying the data in a wide range of social, economic and environmental contexts; and
- the provision of information and advice to government, the general public and a diverse set of specialist users about the nature of climate.



Climate Services Information System

- **Can distinguish 3 main types of “User”:**
 - **Users that are internal; they encompass those parts of the CSIS that take information from other parts in order to generate outputs, products and services** – they include, for example, NMHSs drawing on the services provided by regional centres in order to generate products and services targeted at specific national requirements, and also the research community;
 - **Governments and elements of the service/tertiary economic sector, such as insurance, banking and financial services** – external users who leverage off climate information in order to develop better policies and actuarial assessments that will enable them to govern and conduct their businesses more effectively; and
 - **The main group of external end-users for whom the productivity of their businesses and enterprises are directly affected by climate variability and change**, e.g. agriculture, water, energy.



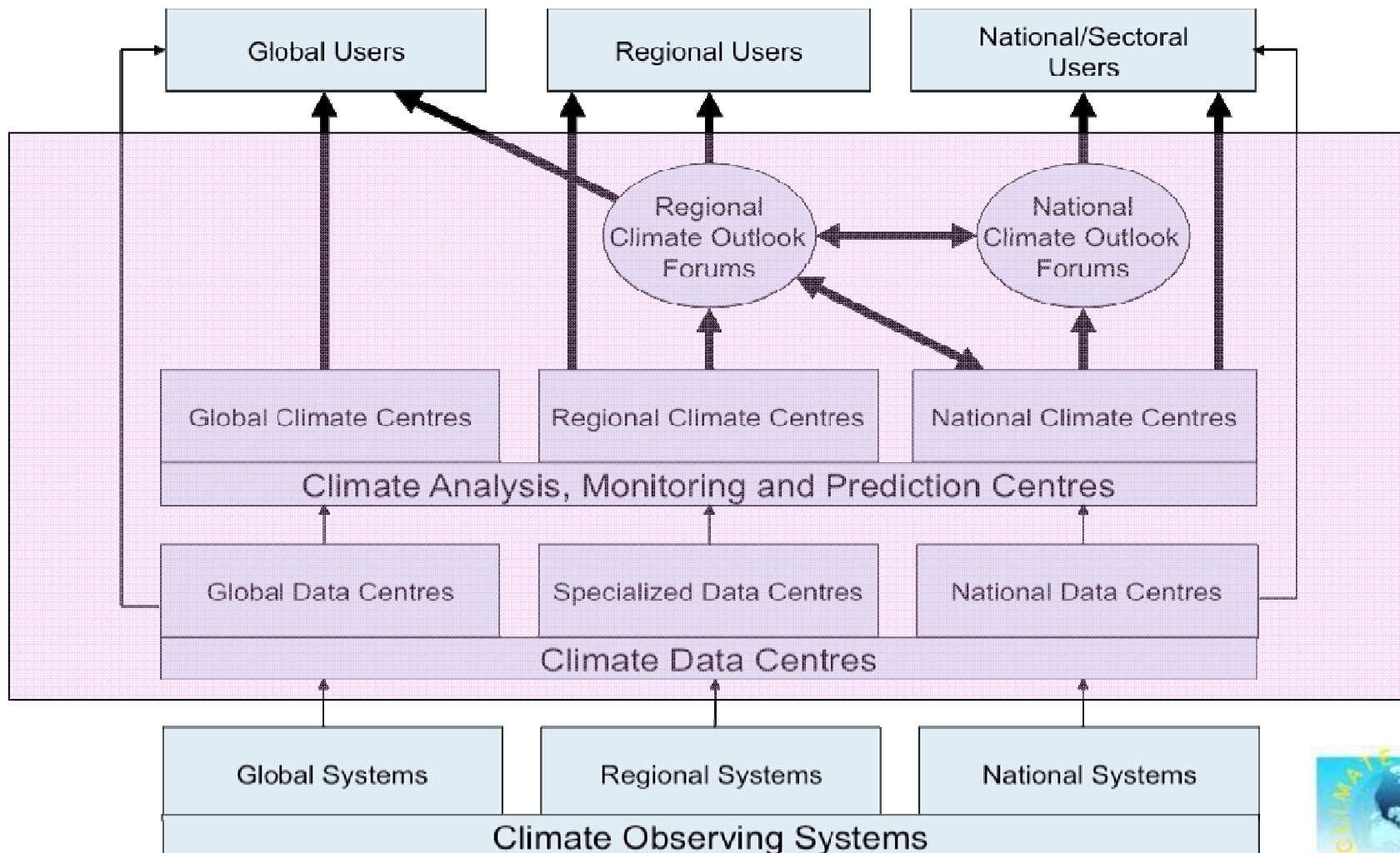
Principal Functions

Most, if not all CSIS Products and services derive from the following hierarchy of functions:

- Stewardship of climate data
- Monitoring of the climate system
- Prediction of the climate system



CSIS Structure



CSIS – Global Level

- Global Data Processing and Forecasting System (GDPFS)
- WMO Information System (WIS)
- Global Data Centres
- Global Climate Monitoring Centres
- Global Producing Centres for Long-Range Forecasting



Global Producing Centres for Long Range Forecasting

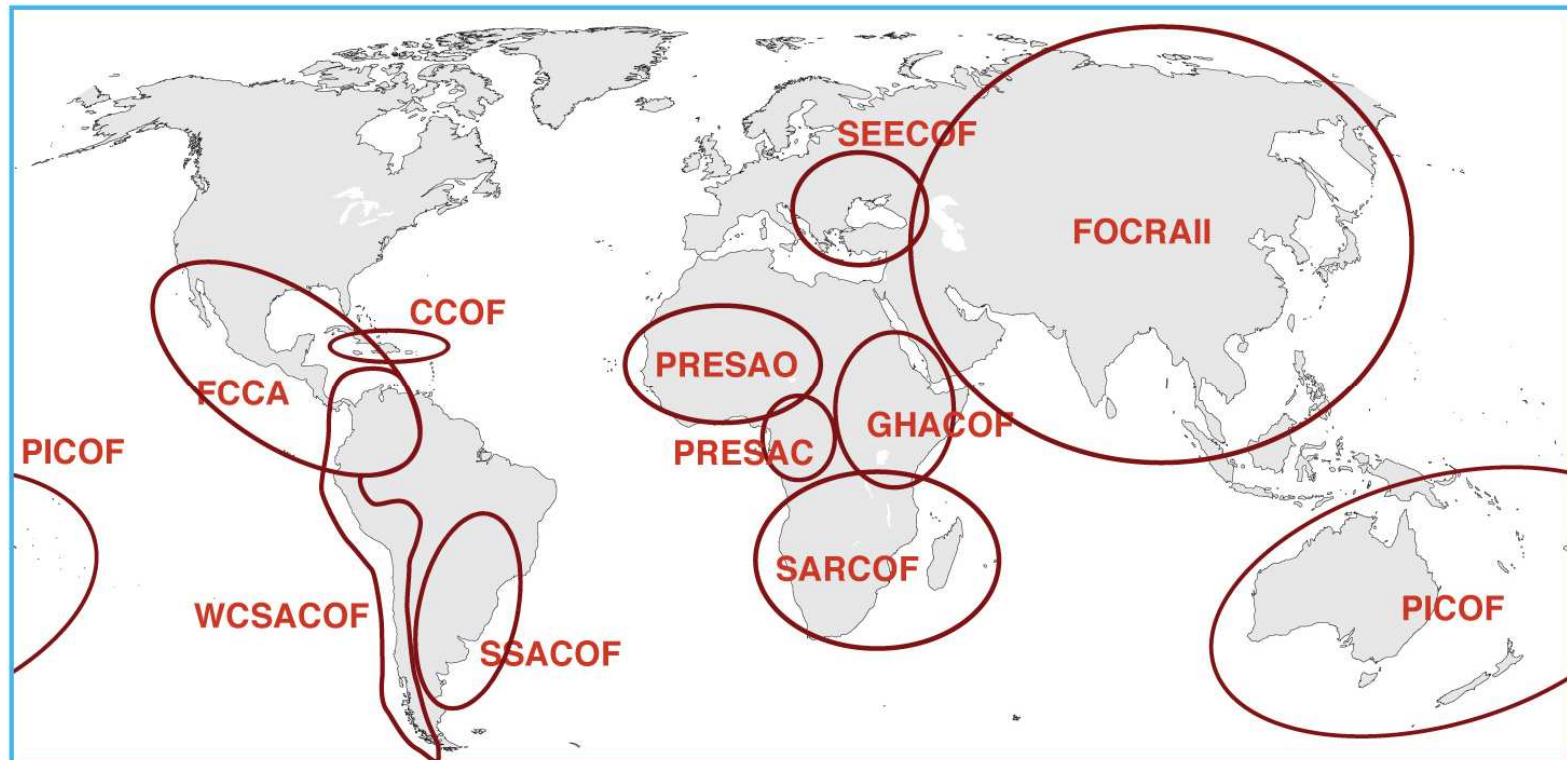


CSIS – Regional Level

- WMO Regional Climate Centres carrying out the following functions:
 - *Data Services, to support operational LRF and climate monitoring*
 - *Climate Monitoring*
 - *Long Range Forecasting*
 - *Climate Change Projections*
 - *Training in the use of operational RCC products and services.*
- Regional Climate Outlook Forums



Regional Climate Outlook Forums



CCOF - Caribbean
FCCA – Central America
FOCRAII – WMO Region 2
GHACOP – Greater Horn of Africa
PICOF – Pacific Islands
PRESAC – Central Africa

PRESAO – West Africa
SARCOF - South Africa
SEECOF - South East Europe
SSACOF – Southeast South America
WCSACOF – West Coast South America



Regional Climate Outlook Forums

- A meeting (face-to-face, by teleconference or online) of regional and international climate experts to develop a consensus for regional climate outlooks, usually in a probabilistic form that will encompass:
 - Presentation of key points for the next (rainy) season,
 - Preparation of national statistical forecasts,
 - Capacity building activities to assist NMHSs in their dealings with specific users,
 - Sharing of experiences in creating new products or improving existing material;
- A broader forum involving both climate scientists and representatives from user sectors, for presentation of the consensus climate outlooks, discussion, and identification of expected sectoral impacts and implications, and the formulation of response strategies;
- Training workshops on seasonal climate prediction to strengthen the capacity of national and regional climate scientists;
- Special outreach sessions involving media experts to develop effective communications strategies.



CSIS – National Level

The essential components of a national climate services programme are:

- Mechanisms to ensure that the climate information and prediction needs of all users are recognised;
- Collection of meteorological and related observations, management of data bases, and the provision of data;
- Coordination of or access to meteorological, oceanographic, hydrological, and related scientific research to improve climate services;
- Multidisciplinary studies: to determine national risks, sectoral, and community vulnerability related to climate variability and change; to formulate appropriate response strategies; and to inform national policy making;
- Development and provision of climate information and prediction services to meet user needs;
- Linkages to other programmes with similar or related objectives to avoid unnecessary duplication of efforts.



Climate Services Information System

Performance Indicators

CSIS products and services should be judged on their:

- **Availability:** at time and space scales that meet user needs,
- **Dependability:** delivered regularly and on time,
- **Usability:** presented in user specific formats that the client can fully understand,
- **Credibility:** such that users can confidently apply them to decision-making
- **Authenticity:** entitled to be accepted by stakeholders in the given decision contexts
- **Responsiveness and flexibility:** to meet evolving user needs, and
- **Sustainability:** affordable and consistent over time



Possible Categorization of National CSIS Providers

■ Category 1: Basic Capacity

- Provides access to the country's climate record to provide a dataset that is foundational for information products offered in the higher categories. Some degree of interaction with users occurs.

■ Category 2: Essential Capacity

- Provides information derived from national climate records in order to assist national development. Other activities include homogeneity testing and adjustment, seasonal prediction and the development of climate watches and warnings for extreme climate events. Interaction occurs with users in one or more sectors in order to identify their requirements for, and advice on, climate information and products.

■ Category 3: Full Capacity

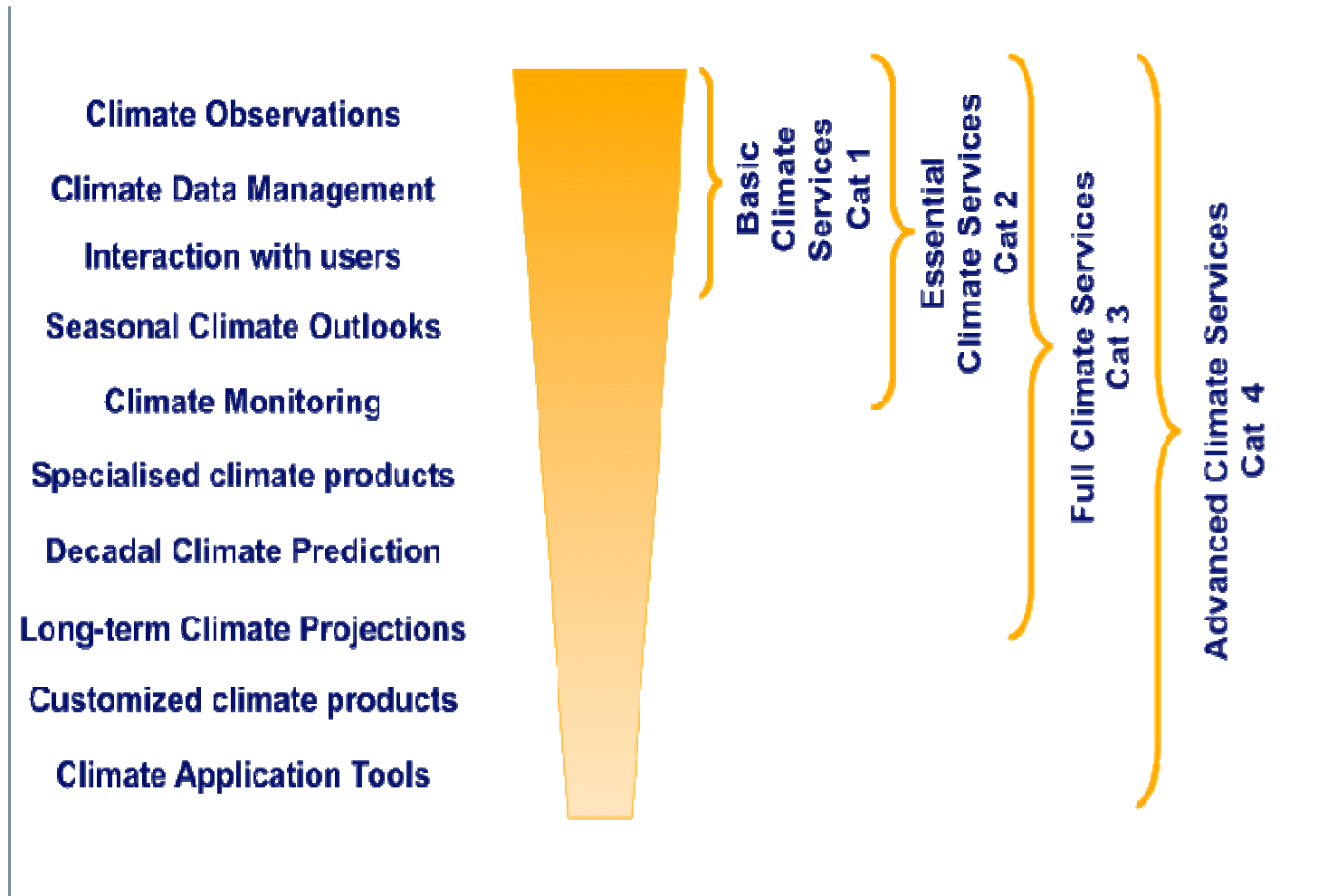
- Provides tailored and downscaled climate products on timescales ranging from seasonal to climate change in order to meet the needs of major sectors. Has the capacity to engage user communities, an effective user interface, and the technical expertise for training climate specialists and for developing curricula. Engages in some level of regional cooperation and support.

■ Category 4: Advanced Capacity

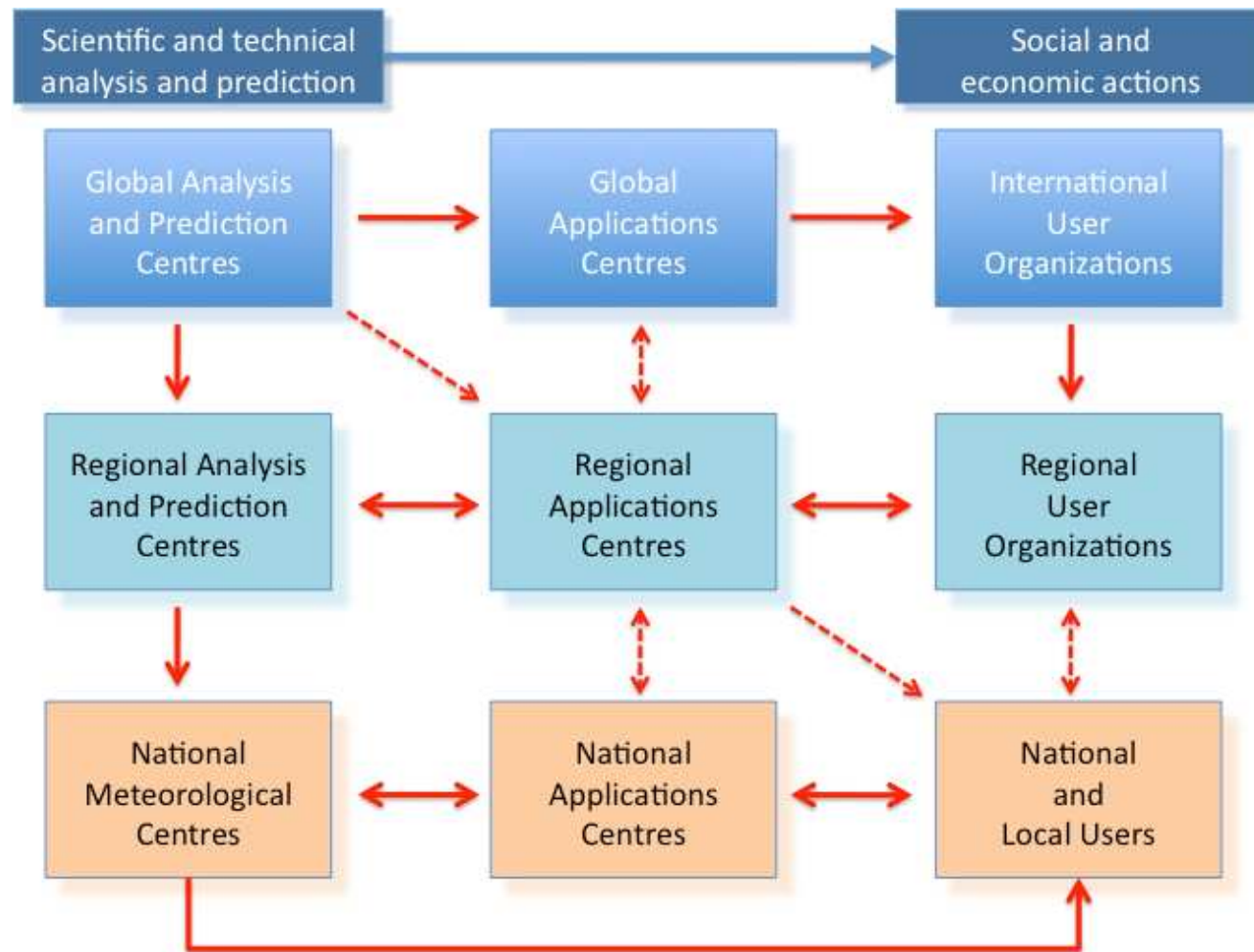
- Has significant research and modelling capabilities to underpin its climate services and applied climate studies. Engages in a high level of global/regional cooperation and support.



Possible Categorization of National CSIS Providers



GFCS User Engagement



Key recommendations

- Make regional implementation of the CSIS a first priority to ensure that all countries have adequate underpinning information on which to build their national capacities.
- CSIS should adopt a notion of seamlessness that would aim to manage and analyse climate data, monitor and predict climate and deliver climate products and services at all time and space scales



Key recommendations

- Sharing of data from longer-term records of daily data will be critical for improving understanding of high impact events.
- Countries that do not yet have well-developed climate services need to identify the organization or organizations that, with the appropriate resources, will be able to deliver them.
- NMHSs will normally be the primary organization for the development of national climate services.



Key recommendations

- Knowledge of user requirements and understanding of how users apply climate information are fundamental to the successful generation and delivery of climate services.
- All elements of the CSIS should be familiar with and have the capacity to tap into and use the vast quantities of data archived and information generated by regional, global and specialised climate centres.

