



World Meteorological Organization
Working together in weather, climate and water

Integrated Drought Management Programme

AVINASH TYAGI

Director, Climate and Water Department

Consultation Meeting

15-16 November, 2010, Geneva, Switzerland



Time Travels Leaving its footprints.....

15th Century

TIME



Portuguese
Explorations

16th Century

TIME



Spanish Colonization

17th Century

TIME



Dutch Commerce

18th Century

TIME



The French
Revolution

19th Century

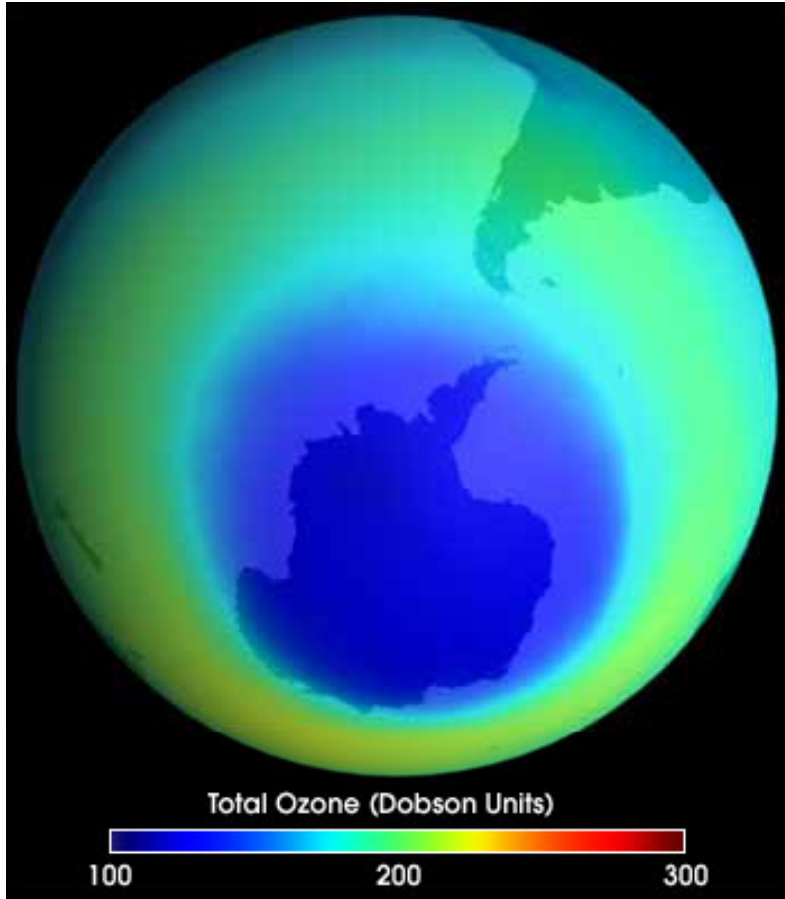
TIME



The Sun Never Sets
on the British Empire



20th Century was it of



Celebration of Independence!
Computers!!
AIDS!!! OR

Discovery of Ozone hole



Greater awareness





Climate Change Challenge



Air temperature



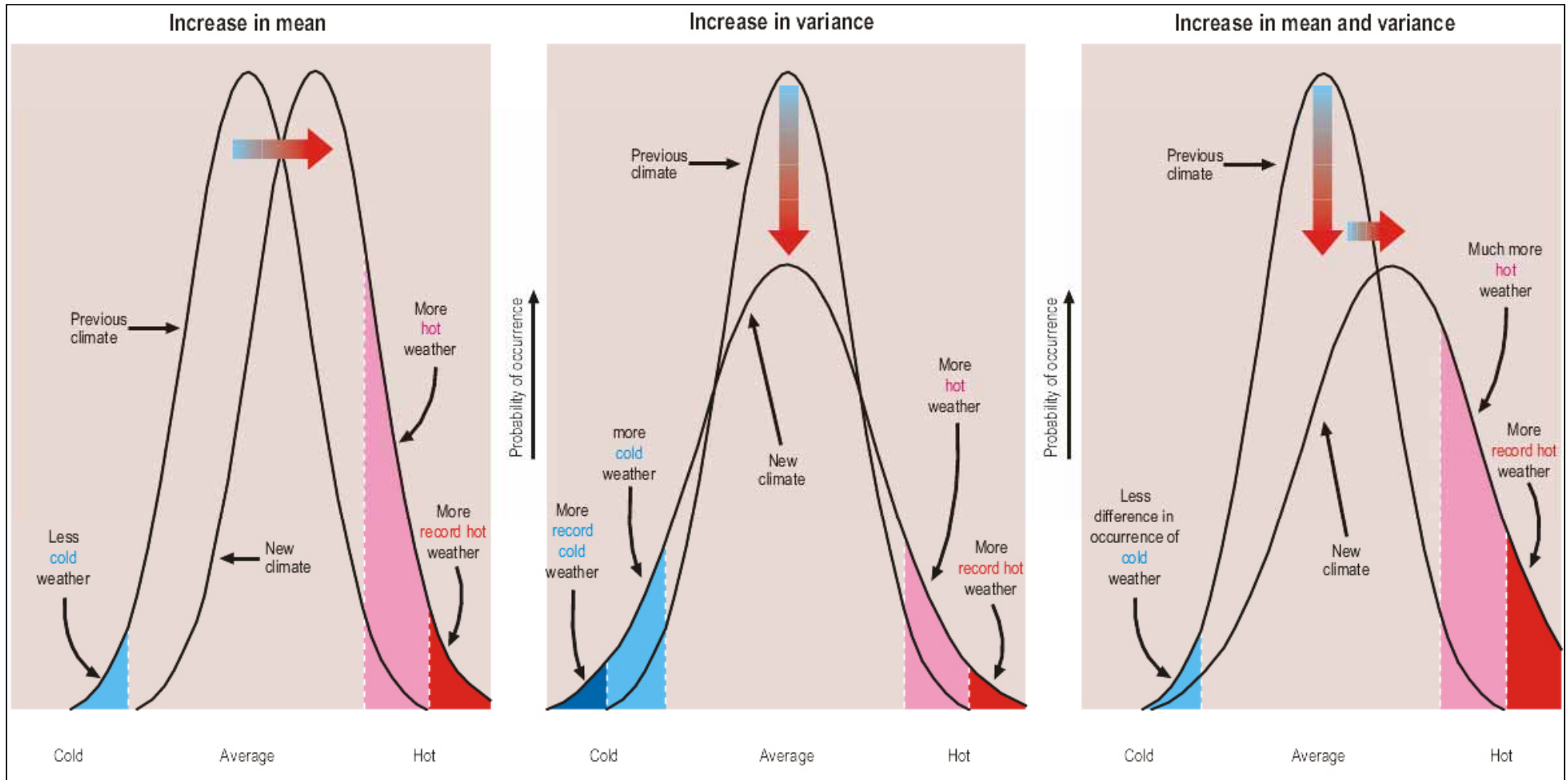
Precipitation form,
timing and quantity



Sea level rise



Probability distributions: temperatures



(Adapted from *Climate – Into the 21st Century*, WMO, 2003, Cambridge University Press)



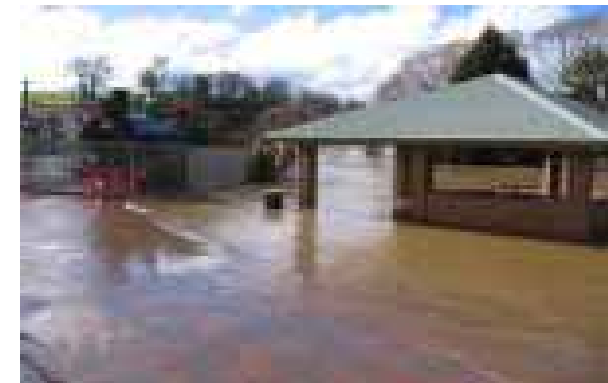
21st Century

Is this going to be the **flood** century?

(Too much water)

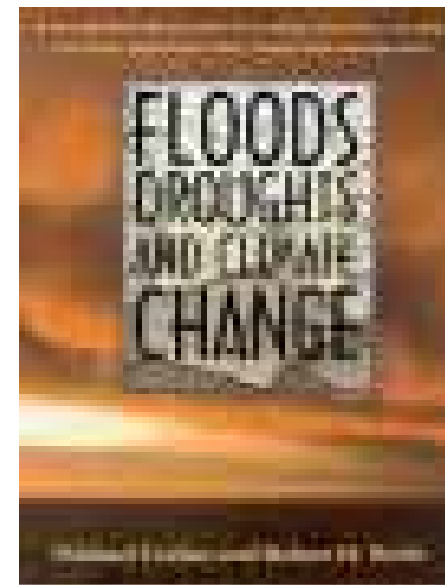


Coastal flooding in Bangladesh



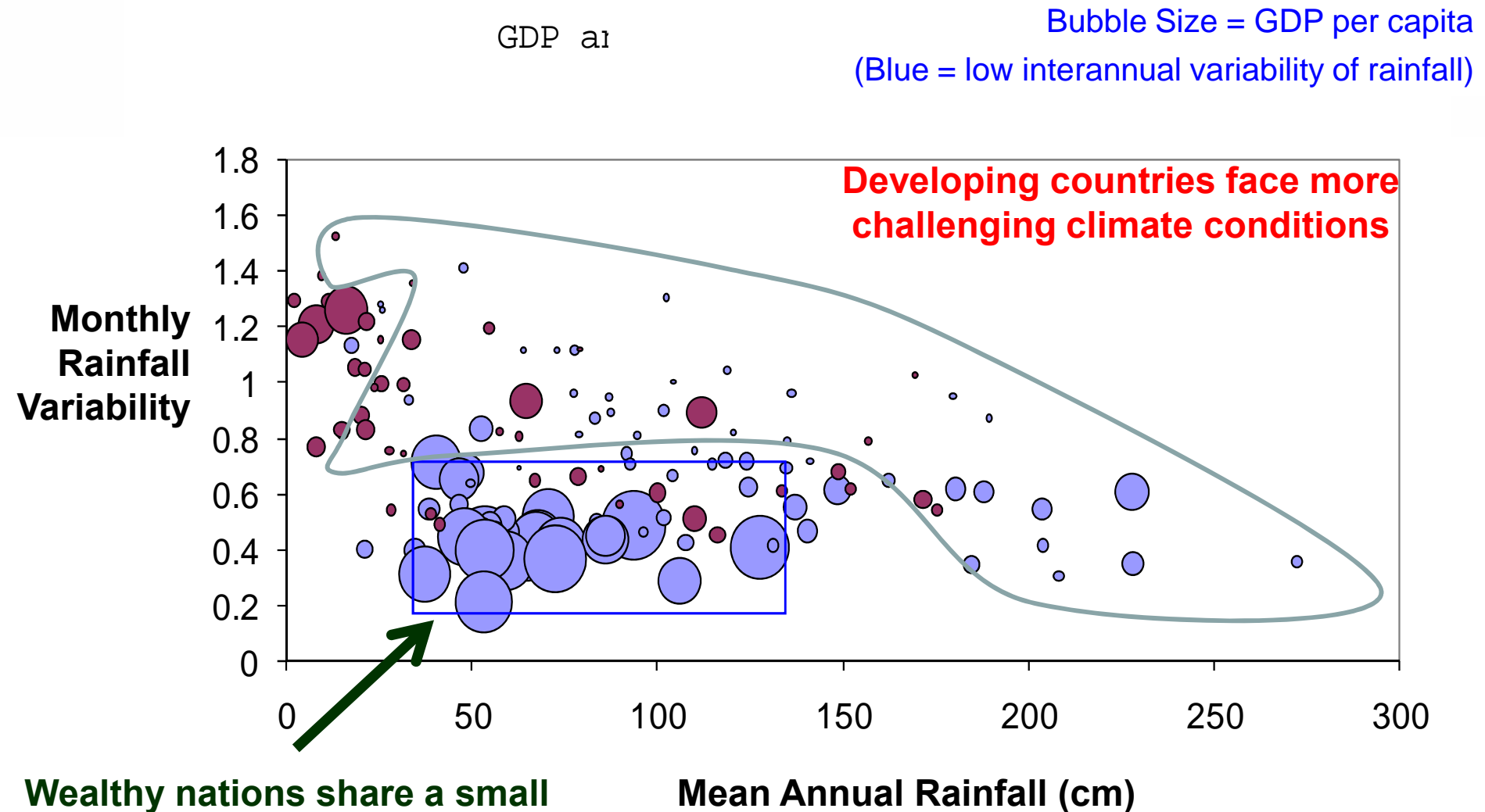


...or the **drought** century?





Rainfall Variability and GDP



Wealthy nations share a small window of favorable climate (low variability; moderate rainfall)



Water Security

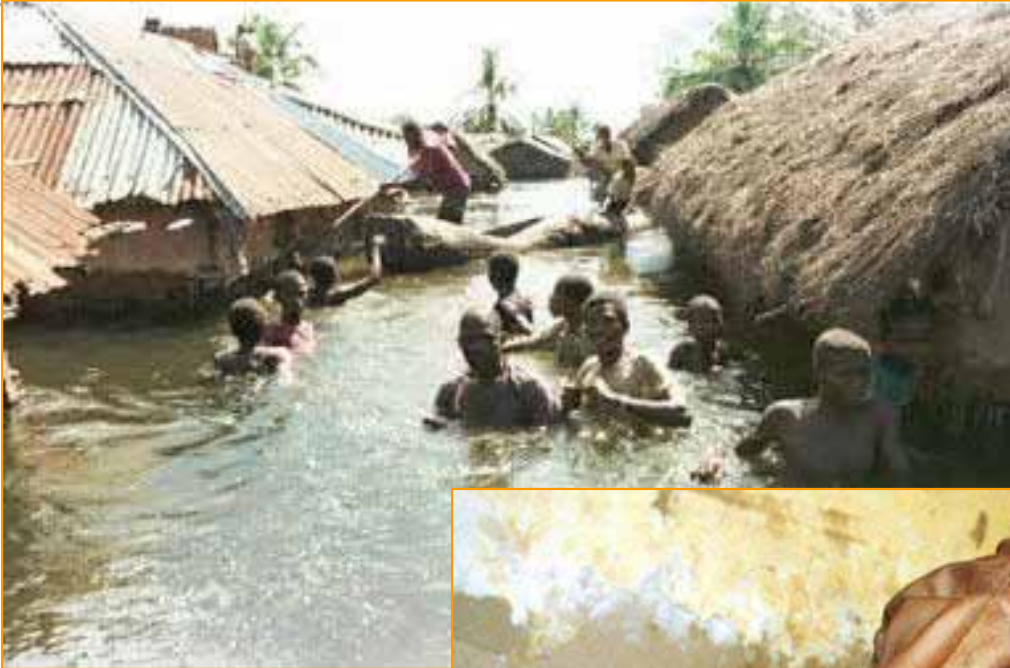


- **Water Supplies**
- **Water Demands**
- **Water Quality**
- **System Operations**
- **Flood Management**
- **Drought Management**





Food Security





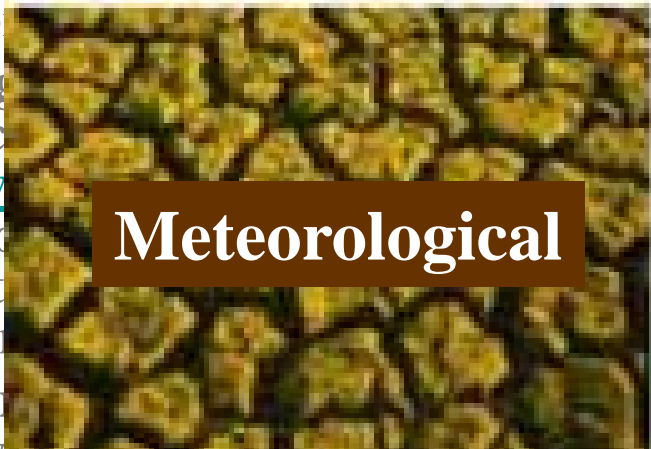
Drought

- **Normal and recurrent feature of climate**
 - **Most complex least understood natural hazard**
 - **Region makes up the core of the global drought and desertification problem.**
 - **Affects more people than any other hazard**
 - **Environmental degradation has affected dry land areas**
 - **Most vulnerable; small farmers; 70% of agricultural output; most important economic sector**
 - **Highest development priority: Poverty eradication**
-



Types of droughts

- **Meteorological** drought is a period of below-normal precipitation. It is the most common type of drought and is often the first to be identified. It is caused by meteorological conditions such as high pressure systems, low humidity, and high temperatures. It is often associated with agricultural drought.
- **Agricultural** drought is a period of below-normal precipitation that is severe enough to cause crop failure. It is often associated with meteorological drought, but it can also occur independently. It is caused by a combination of factors, including low precipitation, high temperatures, and high evaporation rates. It is often associated with hydrological drought.
- **Hydrological** drought is a period of below-normal precipitation that is severe enough to cause a significant and long-term reduction in the levels of surface water and groundwater. It is often associated with meteorological drought, but it can also occur independently. It is caused by a combination of factors, including low precipitation, high evaporation rates, and high water demand. It is often associated with socio-economic drought.
- **Socio-economic** drought is a period of below-normal precipitation that is severe enough to cause a significant and long-term reduction in the supply of some commodity or economic good (for example, water, hay, or hydroelectric power). It is often associated with hydrological drought, but it can also occur independently. It is caused by a combination of factors, including low precipitation, high evaporation rates, and high water demand. It is often associated with agricultural drought.





Drought Management: Shortcomings from Policy Perspective

- **Lack of integrated planning: Most activities are planned and executed on a sectoral basis**
 - **This lacked synergy in achieving the expected benefits.**
 - **Non-participation of local communities from beginning either in preparation of plans or in their execution.**
 - **Non-integration of works with developmental planning.**
 - **Non-availability of accurate and reliable spatial and temporal data: for example, lowered ground water in excess of its annual replenishment.**
-



Drought Management: Shortcomings from Management Perspective

- **Lack of integrated planning: Most activities are planned and executed on a sectoral basis.**
 - **Result in lacked synergy in achieving the expected benefits.**
 - **Non-participation of local communities from beginning either in preparation of plans or in their execution.**
 - **Non-integration of works with developmental planning.**
 - **Non-availability of accurate and reliable spatial and temporal data: for example, lowered ground water in excess of its annual replenishment.**
-



Drought: New Policy Response Needed

“Throughout the world there is now a growing recognition that drought and desertification are multi-faceted problems requiring a developmental rather than a crisis management approach.

The challenge lies in moving towards the integration of a variety of actions, which can mitigate the crisis, and create opportunities for improving the quality of life, maintaining ecosystems and generating wealth and sustainable development.”



Drought Risk

=

Exposure to event

(frequency and severity)

X

Vulnerability of society to the event

(population, demographics, technology, policy,
social behavior, interaction with natural resources)

**Past approach: emphasis on crisis management Little if any
chance for risk reduction**



From crisis management to a developmental approach





Framework for Risk Management

Governance and Organizational Coordination and Cooperation

Risk Identification and Assessment

Historical hazard data, analysis and changing hazard trends

Exposed assets & vulnerability

Risk quantification

Risk Reduction (Prevention & Mitigation)

Sectoral planning

Early warning systems

Emergency preparedness & planning

Risk Transfer

Catastrophe insurance/
bond markets

Alternative risk transfer

Information and Knowledge Sharing Education and training



Resistance Strategies

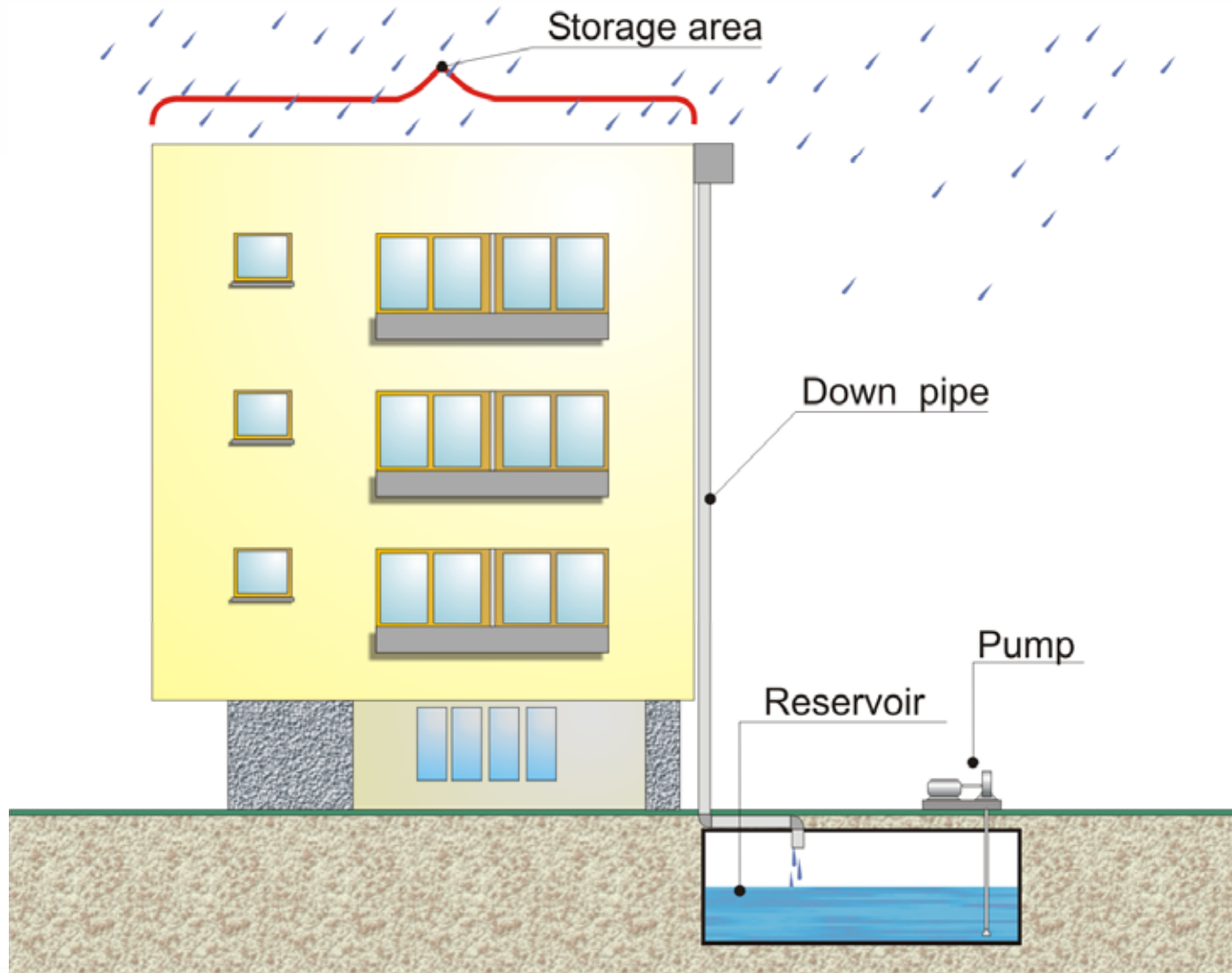
“Resistance” strategies focus mainly on the hazard (flood, drought, etc.) by aiming at prevention





Rainwater Harvesting:

Reservoir in a building





DEMAND Management



More efficient irrigation systems



Basin Planning



Flood Proofing and Building Codes



Flood Hazard Mapping

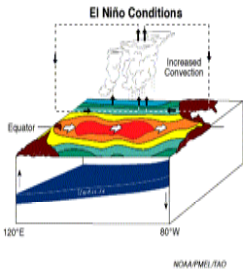


CIIFEN concept: An Early Warning System focused on ENSO , climate variability and climate change

1)Regional Seasonal Forecast

3) Optimize Information Systems

El Niño / La Niña



Improve Early Warning

2)Generation SECTORIAL Risk Scenerios

4) Link with Governmental Early Warning Systems at Planning, Sectorial preventive action and mitigation reaction.



CIIFEN



Drought: New Policy Response Needed

“Throughout the world there is now a growing recognition that drought and desertification are multi-faceted problems requiring a developmental rather than a crisis management approach.

The challenge lies in moving towards the integration of a variety of actions, which can mitigate the crisis, and create opportunities for improving the quality of life, maintaining ecosystems and generating wealth and sustainable development.”



Need for Integrated Drought Management

- **Conceptual integration**
 - Meteorological
 - Hydrological
 - Agricultural
 - Socio-economic
 - **Horizontal integration over all sectors impacted by drought, inter alia**
 - Natural resource management
 - Health and population development
 - Rural and urban development
 - **Vertical integration**
 - linking policy and planning down to grassroots communal problem solving
 - National, Sub-national and Local
 - **Integration of action in all phases of risk management cycle**
 - **Integration of traditional knowledge and modern technology**
 - **Integration of existing national and international programmes and activities**
-



Integrated Drought Management Programme

Objective

To provide policy and management guidance through globally coordinated generation of scientific information and sharing best practices and knowledge for drought management.

- Better scientific understanding and inputs for drought management;
 - Drought risk assessment, monitoring, prediction and early warning;
 - Policy and planning for drought preparedness and mitigation across sectors; and
 - Drought risk reduction and response.
-



Key Principles

- **To shift the focus from reactive to proactive measures through mitigation, vulnerability reduction and preparedness;**
 - **To integrate the vertical planning and decision making processes at regional, national and community levels into a framework of horizontally integrated sectors and disciplines (such as agriculture, water management);**
 - **To promote evolution of a knowledge base and establishing mechanisms through dialogue for sharing it with stakeholders across sectors at all levels;**
 - **To build capacity of various stakeholders at different levels.**
-



Requirements

- **A scientific and evidence-informed basis to proposed interventions;**
 - **A comprehensive policy framework at both national and regional levels to tackle droughts;**
 - **A cross-institutional arrangement whereby water, land, agriculture and ecosystem issues are tackled jointly;**
 - **A national and regional framework for drought monitoring, early warning and response.**
-



Beneficiaries

- **People** living in drought prone areas
 - **Governmental organizations** and agencies with improved capacities in the development and implementation of national drought policies, management (including land, water and agriculture development) and preparedness plans including monitoring and prediction;
 - **Regional and national organizations**, agencies and institutions engaged in monitoring, prediction, and providing early warning of drought and taking preventive actions;
 - **Non-governmental organizations** and government agencies responsible for the implementation of drought response activities at various levels.
-



Services Provided

- **Regional coordination of drought monitoring, prediction and early warning activities, serving as interface between the climate service providers and various stakeholders in drought management;**
 - **Collection and dissemination of information and knowledge on good practices;**
 - **Guidelines, methodologies, tools and supporting documentation on policy development and management practices and procedures; and**
 - **Capacity building and advice on Integrated Drought Management**
 - **Inception of pilot projects and coordination of regional projects to showcase best practices in scientific inputs, policy and planning for drought management and drought risk reduction;**
 - **An online Drought HelpDesk to respond to expressed needs for assistance in drought risk assessment, monitoring, prediction, early warning, preparedness and mitigation..**
-



Outputs

- **Knowledge base:** compilation of information and knowledge on recorded practices in drought planning and management;
 - **Guidance** on technical as well as managerial and institutional aspects through a series of techniques, tools and methodologies;
 - **Advocacy** and specific recommendations for implementing a new integrated approach to drought management;
 - **Stakeholder buy-in** for the integrated drought management approach through regional and country dialogues;
 - **Improved drought early warning** services, including monitoring and prediction and application of drought prediction products, building upon existing regional initiatives;
 - **Mechanisms for stakeholders** to gain entry to processes and access to information through establishment of drought action networks for these regions.
-



Impacts

- **Potential for poverty alleviation by focusing on preventative and response strategies in the drought-prone areas;**
 - **Enhanced resilience of economies and societies to the incidents of droughts;**
 - **Improved climate, water and agriculture information on droughts and drought management and climate change adaptation;**
 - **Effective use of information by those responsible for drought policy development and management, including those concerned with emergency response, as well as operation of engineering works (such as reservoirs) and water supply systems;**
 - **A multi-disciplinary approach to drought management through land, water, and agriculture perspectives;**
 - **Use by countries of an improved approach and new tools for drought management supporting land, water and agriculture through Integrated Water Resources Management (IWRM);**
-



Impacts

- **Ensured coordination and scientific back-up to regional drought management projects;**
 - **Cross-fertilization of ideas and experience between regions, so that success achieved in one way be applied in others;**
 - **Potential for improved coordination of international assistance and response to actual drought events;**
 - **Stakeholder participation and buy-in through networks in drought management from policy to implementation;**
 - **Better capacities in countries to adapt to the increasing number of droughts due to climate change, and robust mechanisms for dealing with regional and transboundary aspects;**
 - **Coordinated building and development of drought management institutions at global, regional and national level (through the identification of experts and centres of excellence) and sharing of knowledge and common practices.**
-



Partners

- **Food and Agriculture Organization (FAO)**
 - **UNDP Drylands Development Centre**
 - **United Nation Convention to Combat Desertification (UNCCD)**
 - **International Strategy for Disaster Reduction (ISDR) ReliefWeb
(UN Office for the Coordination of Human Affairs (OCHA))**
 - **U.S. National Drought Mitigation Center (NMDC) at the University
of Nebraska**
 - **Academic institutions working on drought and drought-related
issues**
 - **Regional Drought Monitoring Centres**
 -
 -
-



Thank you
Merci
Gracias
Спасибо
谢谢
شكرا





Activities (Initial)

- Close consultations with relevant intergovernmental and non-governmental organizations active in the field of drought early warning, policy development and management (land, water and agriculture) through an inception workshop.
 - Identification of potential partners working in drought management issues so as to identify and build on their strengths, seeking ways to serve their needs and obtain their commitment, and agree their roles in the Programme in order to cover the necessary scientific, policy, socio-economic, advocacy and the institutional aspects involved.
 - An extensive enquiry will be commenced to assemble comparable information on past droughts and drought-related disasters, both as regards their physical characteristics and their impact on the local economy and society.
 - Review of services of drought monitoring and prediction centres and assessment of the effectiveness of the services provided, including operational as well as technical aspects.
-



Activities (Initial)

- Regional dialogues will be held in certain regions in order to build upon existing regional initiatives in drought management, preparedness and mitigation, and to create buy-in by regional stakeholders into the Programme.
 - Development of concept of demonstration projects in consultation with regional partners or the regional nodes.
 - The information will be used to prepare an inception report including a detailed programme strategy, work plans and budget for the Implementation Phase of the Programme.
 - The inception report will also describe the current status of the regional programme nodes and the linkages between the global, regional and national levels.
-

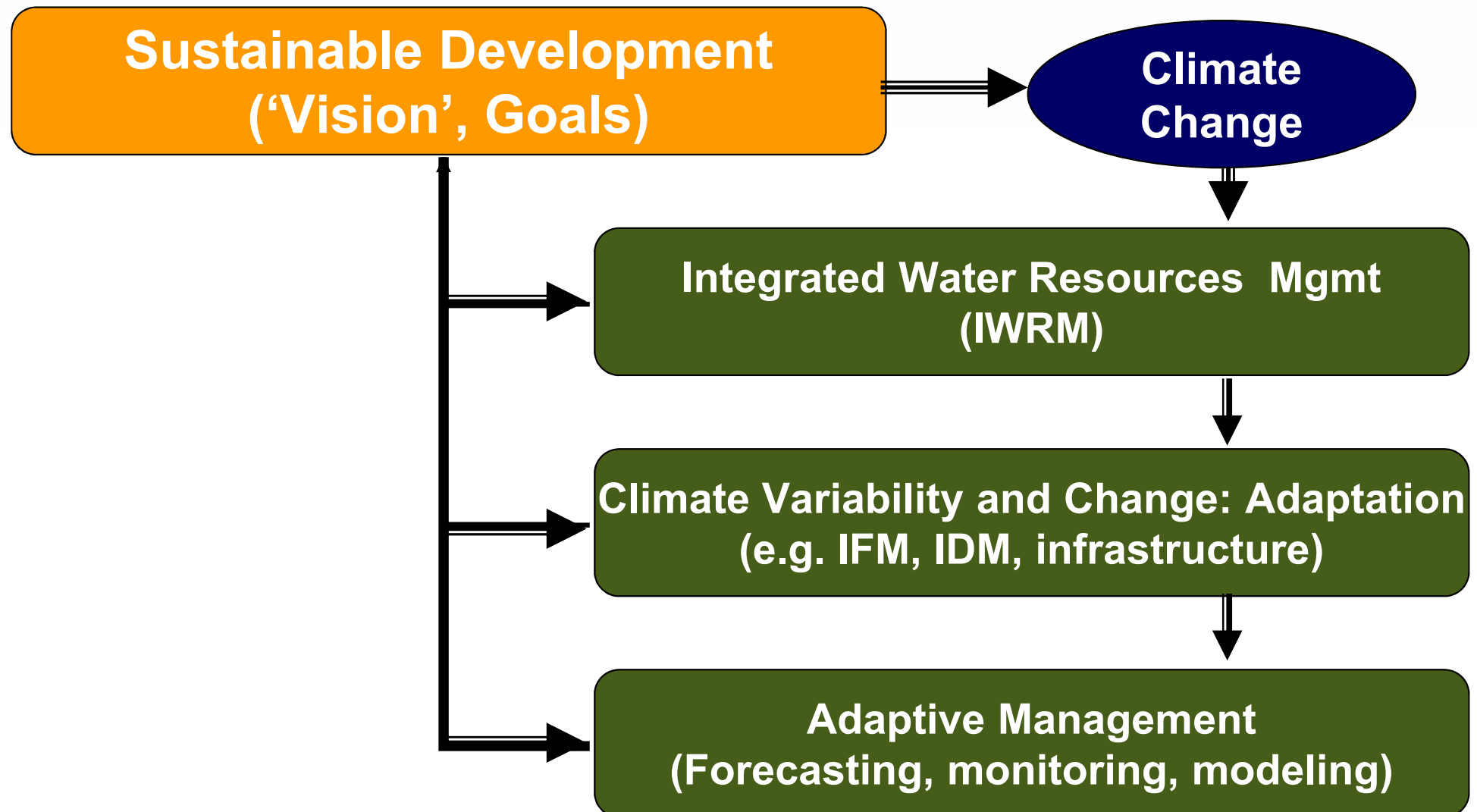


Activities (Implementation)

- The activities commenced under (a) to (f) of the Inception Phase will be continued and completed during this Phase.
 - A broadly comprehensive and integrated approach to drought management will be developed, with the emphasis on socio-economic aspects, taking into account global changes and challenges.
 - A catalytic and pro-active role will be played in facilitating the development of regional activities under the programme and in coordinating existing and new regional projects.
 - Pilot studies will be undertaken, in cooperation with relevant regional groups, to apply the new approach to drought management, provided the funds are available. Initially these would be in different regions and with different aspects of drought issues (e.g. climate information, water supply drought – groundwater etc.)
 - Efforts will be made to obtain funding to implement the plans developed for each of the locations; some may require substantial capital investment, while others may focus more on legislative and regulative action.
-



Climate Change and Sustainable Development



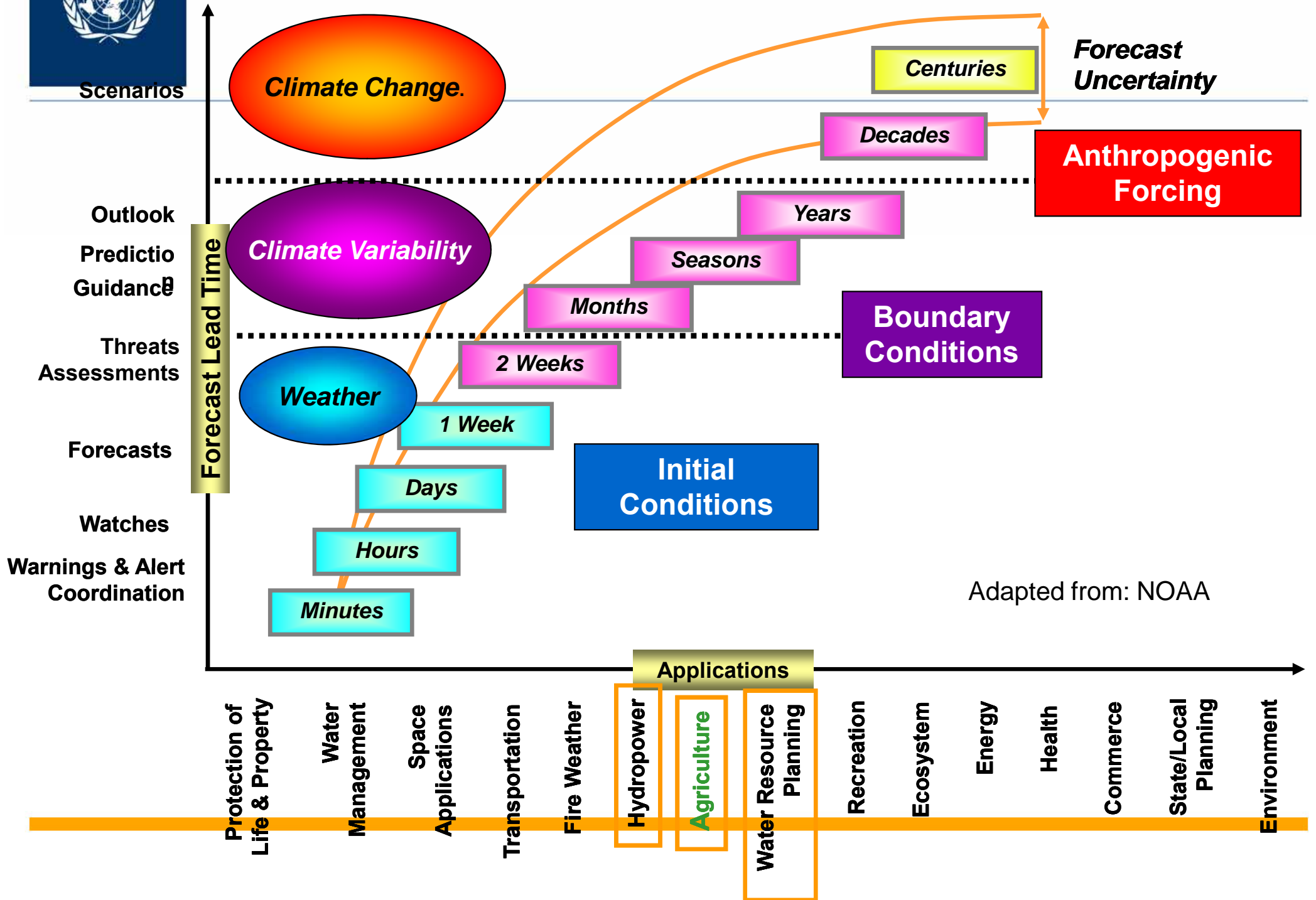


Activities (Implementation)

- Experience with drought planning and management in each region will be collected, including that gained in the above projects, and made available in the form of guidelines, methodologies and tools for use in other regions.
 - A resource and information centre will be established on the subject, with an online interface called a HelpDesk. Where requested the centre can support transboundary “hot spots”, and encourage the establishment of multi-lateral drought management agreements, all within the context of IWRM.
 - An operational link will be maintained with the IWRM information community and the GWP ToolBox, so that, on the one hand, maximum use can be made of existing practices and techniques and, on the other hand, lessons learnt and new techniques developed are fed back into the community for wider dissemination.
 - The above centre could act as a focus for international coordination and assist drought prone communities and donors to work together to minimize drought impacts and respond to the threat and reality of droughts.
 - One year before the end of this phase, a study will be undertaken as to the desirability and feasibility of extending the Programme.
-



A Seamless Climate Prediction Framework

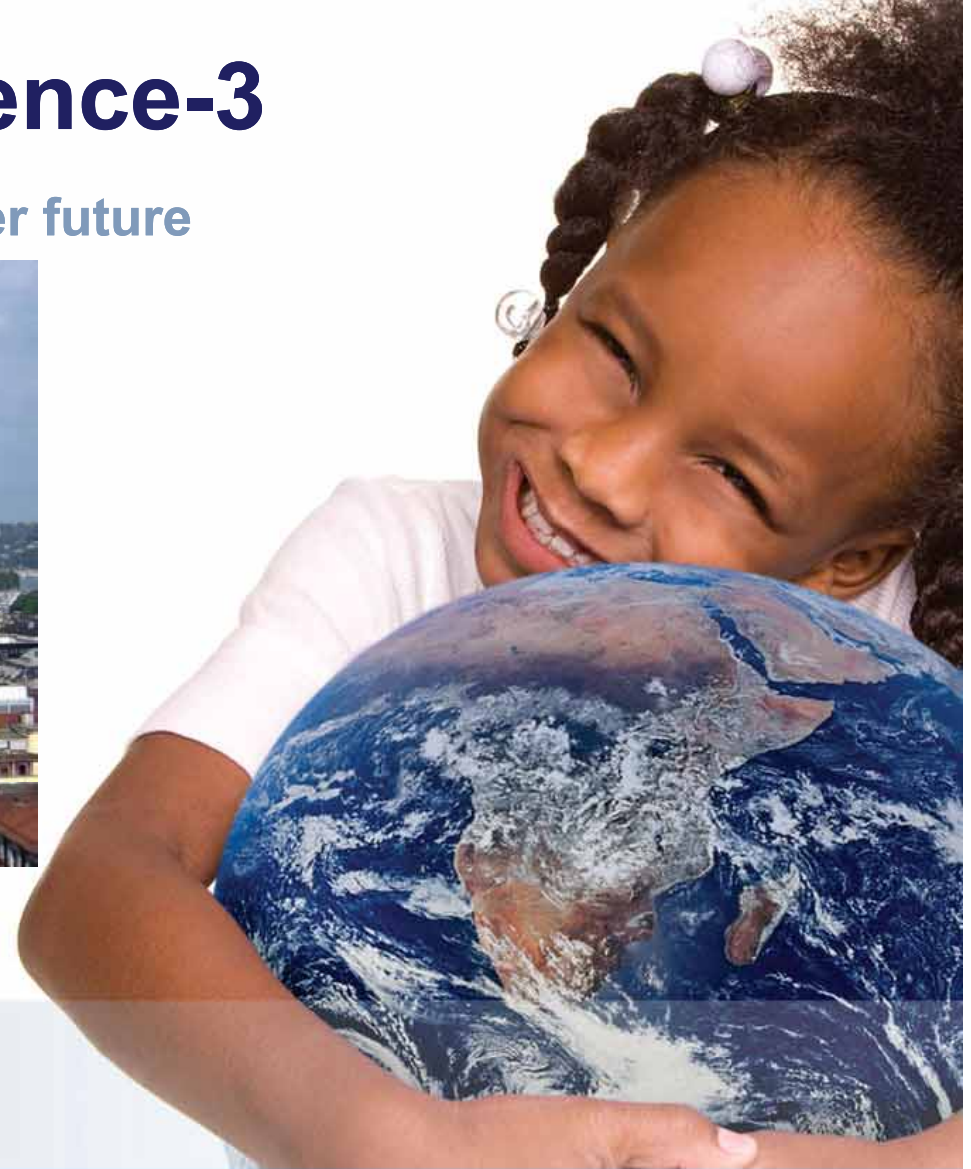


World Climate Conference-3

Better climate information for a better future



Geneva, Switzerland
31 August–4 September 2009



**World
Meteorological
Organization**
Weather • Climate • Water



**UN SYSTEM
DELIVERING AS ONE ON
CLIMATE KNOWLEDGE**



Global Framework for Climate Services

