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**Strategic Initiative on Climate Change Impacts,
Adaptation, and Development in Mountain Regions**

CLIMATE CHANGE IMPACTS AND ADAPTATION IN MOUNTAIN AREAS OF THE MENA REGION

Presentation of the Position Paper



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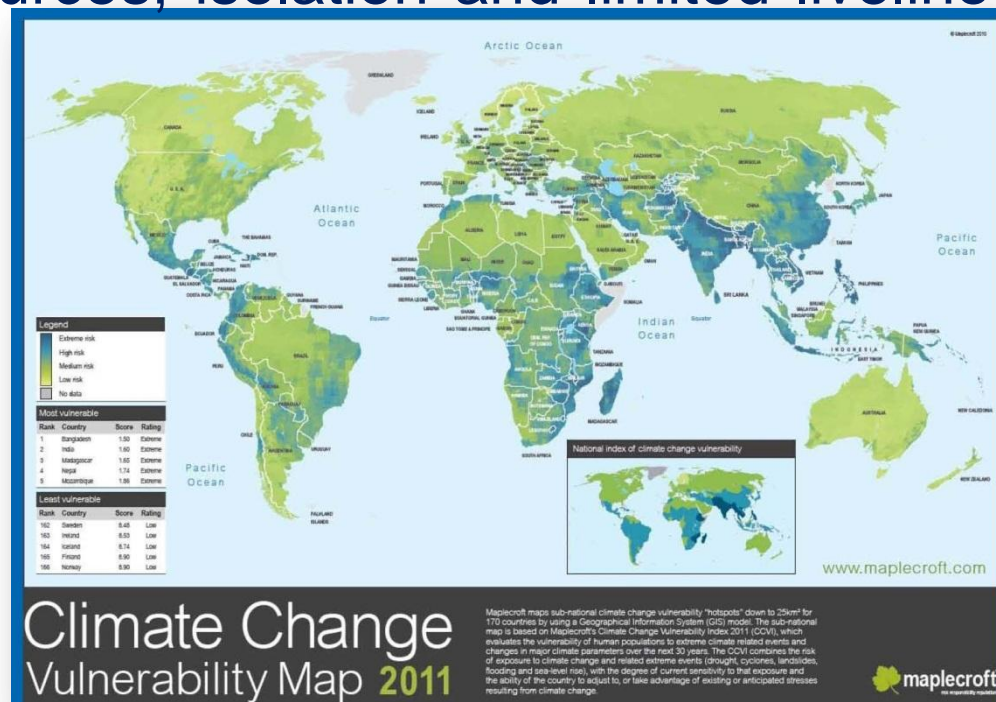


Mountains in the MENA region

- In many of the MENA countries, **mountains are vital for sustainable development**, as they significantly contribute to food security, fresh water supply, biodiversity protection, goods and key ecosystem services ;
- There are **large differences in geographical, geological, climatological and socio-economic characteristics** within the MENA mountain region, and a corresponding diversity of services and related key issues ;

Mountains in the MENA region

- **Mountain ecosystems are particularly vulnerable to climate change** due to their high relief, steep slopes, shallow soils, adverse climatic conditions, and geological variability ;
- **People living in mountain regions are particularly vulnerable to climate change** due to high poverty rates, poor health, high dependence on natural resources, isolation and limited livelihood diversity.

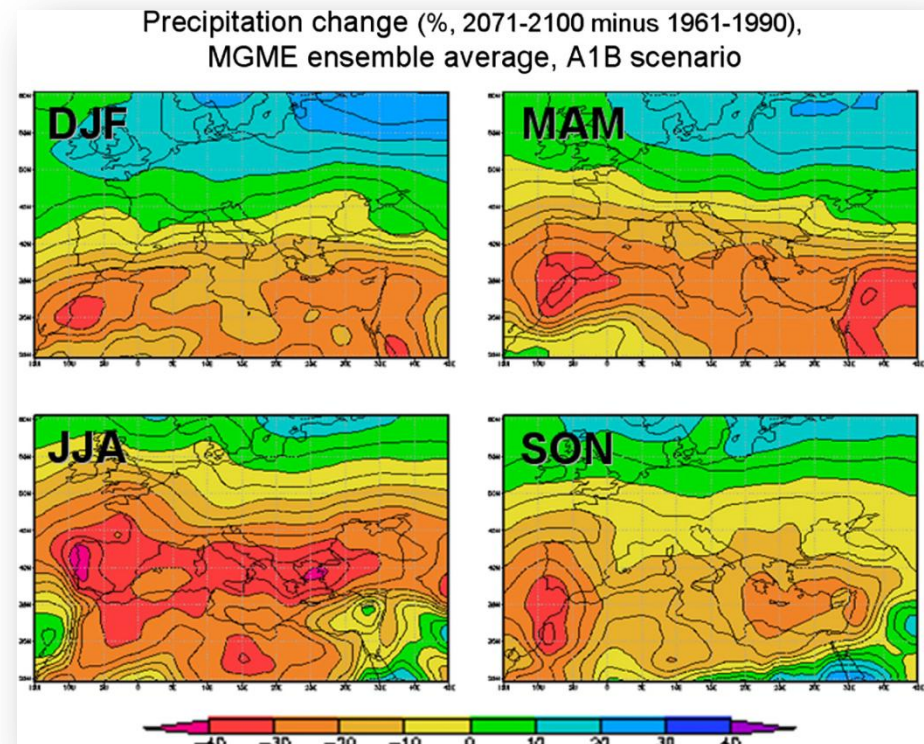


Climate change in mountain areas

- Worldwide, **few assessments of the impact of climate change** have been conducted on mountain regions ;
- Predictions for the 21st century indicate that **temperatures will continue to increase disproportionately in mountain areas** :
The rate of warming in mountain systems is projected to be two to three times higher than that recorded during the 20th century ;
- The Mediterranean mountains seem to suffer the double jeopardy of being mountains and being located near the Mediterranean basin :
 - Mediterranean mountains: +1.4 to +5.1 C for 2055
 - Near East mountains : +3 to +4 C
 - Southern part of the Arabian Peninsula : +2 to 3 C
 - Eastern Anatolia and central Iran : +4 to +5 C

Climate change in MENA

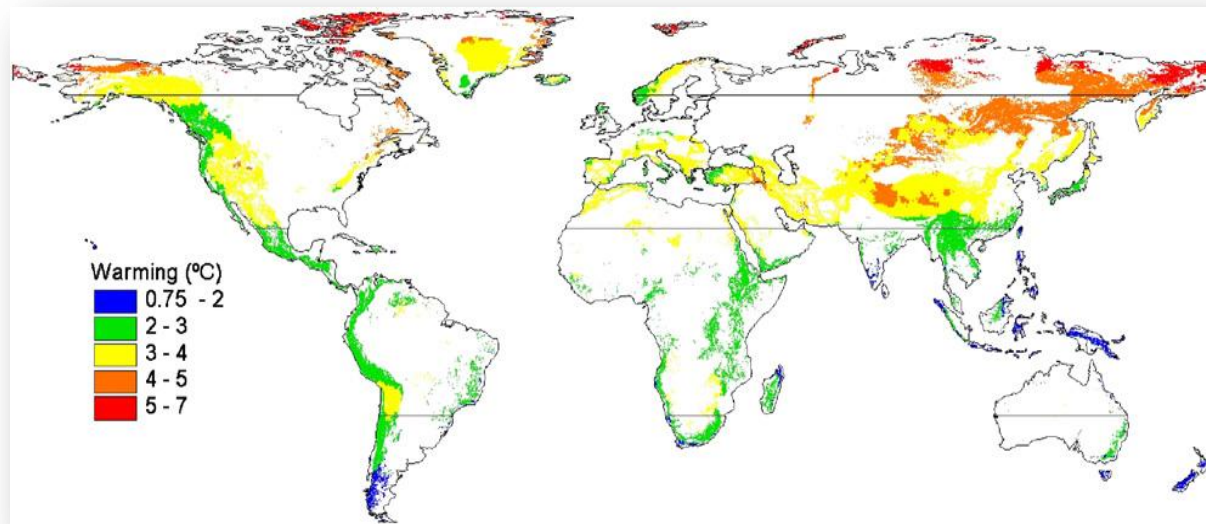
- **MENA region is expected to become hotter and drier ;**
- **Climatic inter-annual variability is projected to generally increase**, as is the occurrence of extreme heat and drought events ;
- Most global and regional climate models conclude that **the MENA region might be particularly affected by climate change**, as the region is one of the most water-stressed in the world and as food security and ecosystems are highly dependent on an already erratic and dry climate.



Giorgi and Lionello, 2008

Climate change in MENA mountain regions

- In the Mediterranean mountains, warming would varies between **+1.4 C and +5.1 C for 2055** (+1.6 C and +8.3 C for 2085), with reduction of precipitation, mainly during spring (**-17% under A1fi and -4.8% under B1 for 2085**) ;
- In the Atlas Mountains, the warming would reach between **+2.2 to +3.1 C in 2050** according to scenarios with a decrease in precipitation between **-2.3 to -5.3%** (-6.3 to -8.8% during spring season) ;
- Most of the Near East mountains will warm up between to **+3 to+ 4 C** in the worst-case scenario

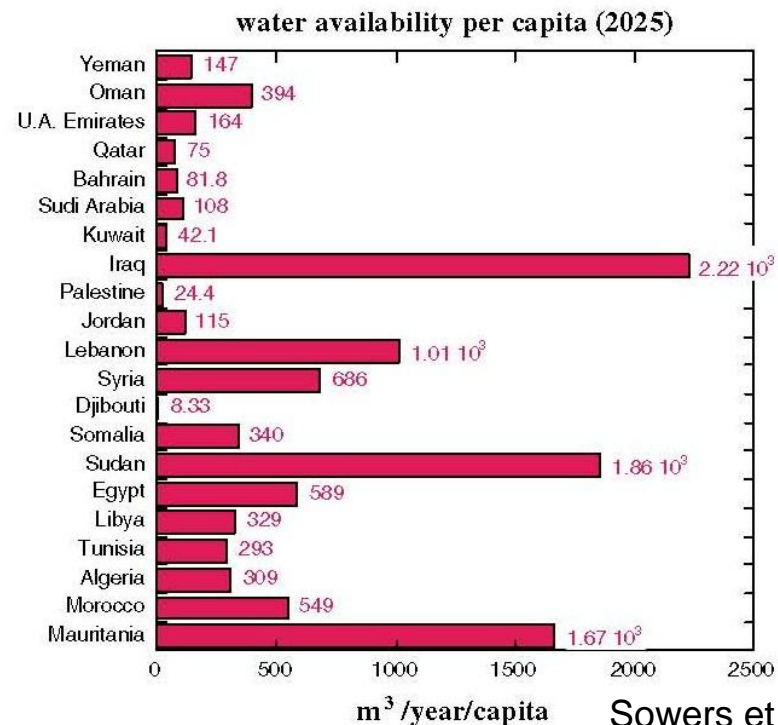
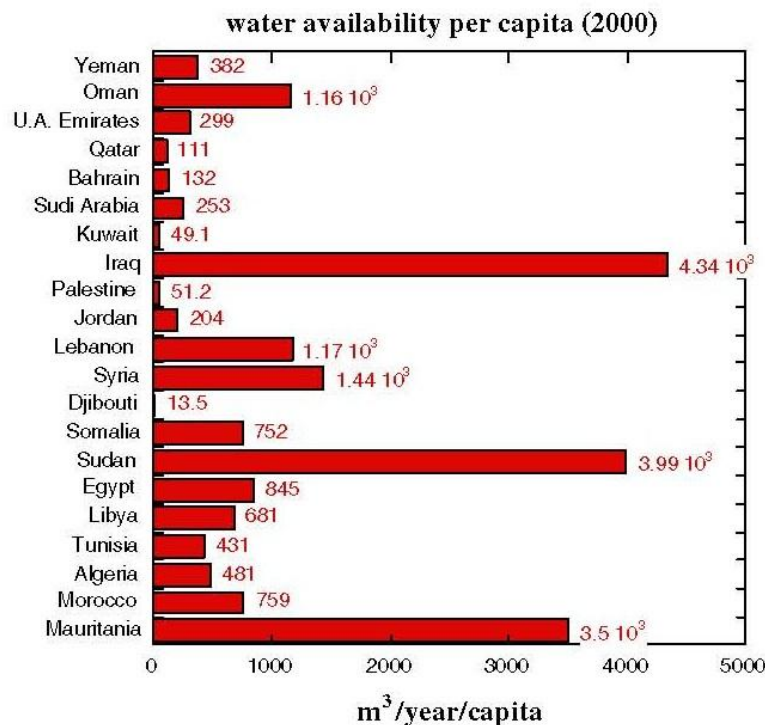


Projected warming for 2055, *A1FI* scenario (Nogués-Bravo *et al.*, 2007)

Impacts of climate change in MENA mountain regions

■ *Climate change will likely :*

- **Reduce** the amount and duration of snow cover, water availability, hydropower potential, rangeland cover and productivity, agricultural productivity, biodiversity ;



Sowers et al., 2011

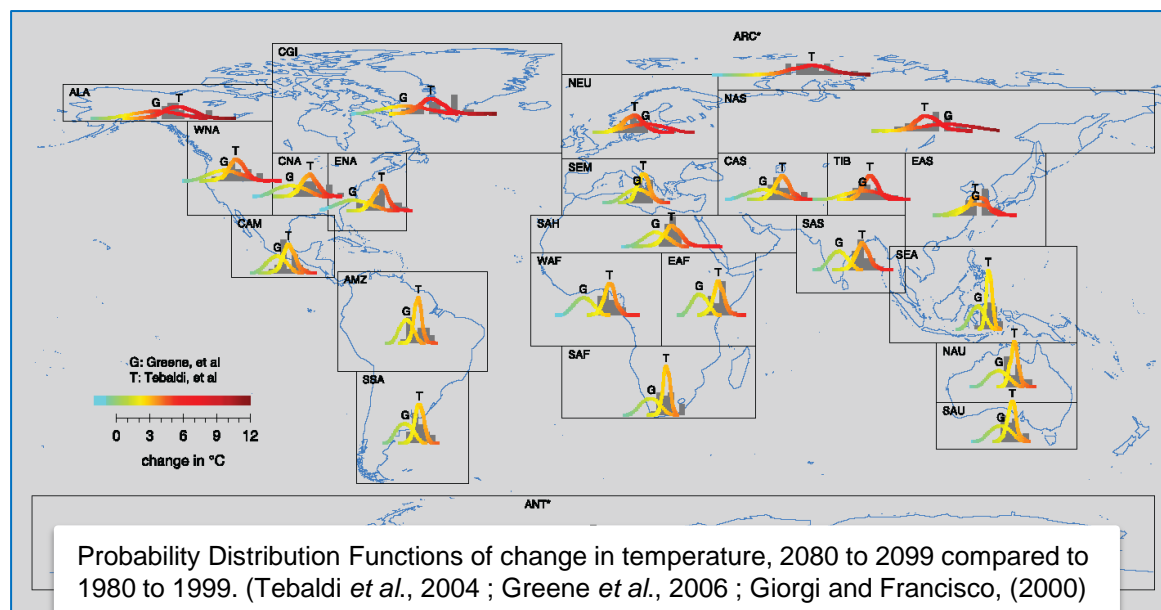
Impacts of climate change in MENA mountain regions

■ *Climate change will likely :*

- **Increase** the competition for surface water, risk of extreme events (flooding, storms, fires, landslides, avalanches, and rock falls), occurrence of droughts, poverty, human displacement, social inequalities (gender, poor and young people) ;
- **Change** bioclimatic levels, distribution of plant and human diseases.

Uncertainties in climate change projections

- Uncertainty in future climate change trends derives from three main sources: **forcing, modelling, and internal variability** ;
 - In general, temperature changes are relatively more consistent than precipitation changes ;
 - In mountainous regions, changes are generally not detected by the current spatial resolution of Global and Regional Circulation Models ;
 - However, **in the MENA region relatively fewer uncertainties** in climate change projections.



Adaptation options to climate change

- A number of adaptation options have been identified under national development and research programs, including in National Communications (NCs) and in National Adaptation Programme of Action ;
- **Most MENA governments have concentrated the bulk of their resources on large scale supply side projects** such as desalination, dam construction, inter-basin water transfers, promoting irrigation schemes, tapping fossil groundwater aquifers, and importing virtual water ;
- Climate change **in the MENA mountain region is mainly addressed under the perspective of deforestation and forest fires mitigation**, improvement of **watershed resilience** as well as **fauna and flora biodiversity protection** ;
- **In arid and semi-arid areas of the MENA region, adaptation is closely linked to mitigation**, as most of the measures adopted to maintain vegetation cover, improve crop yields and water use efficiency, reduce soil erosion, and stabilize populations on their lands contribute to increase carbon sequestration within soil and plants.

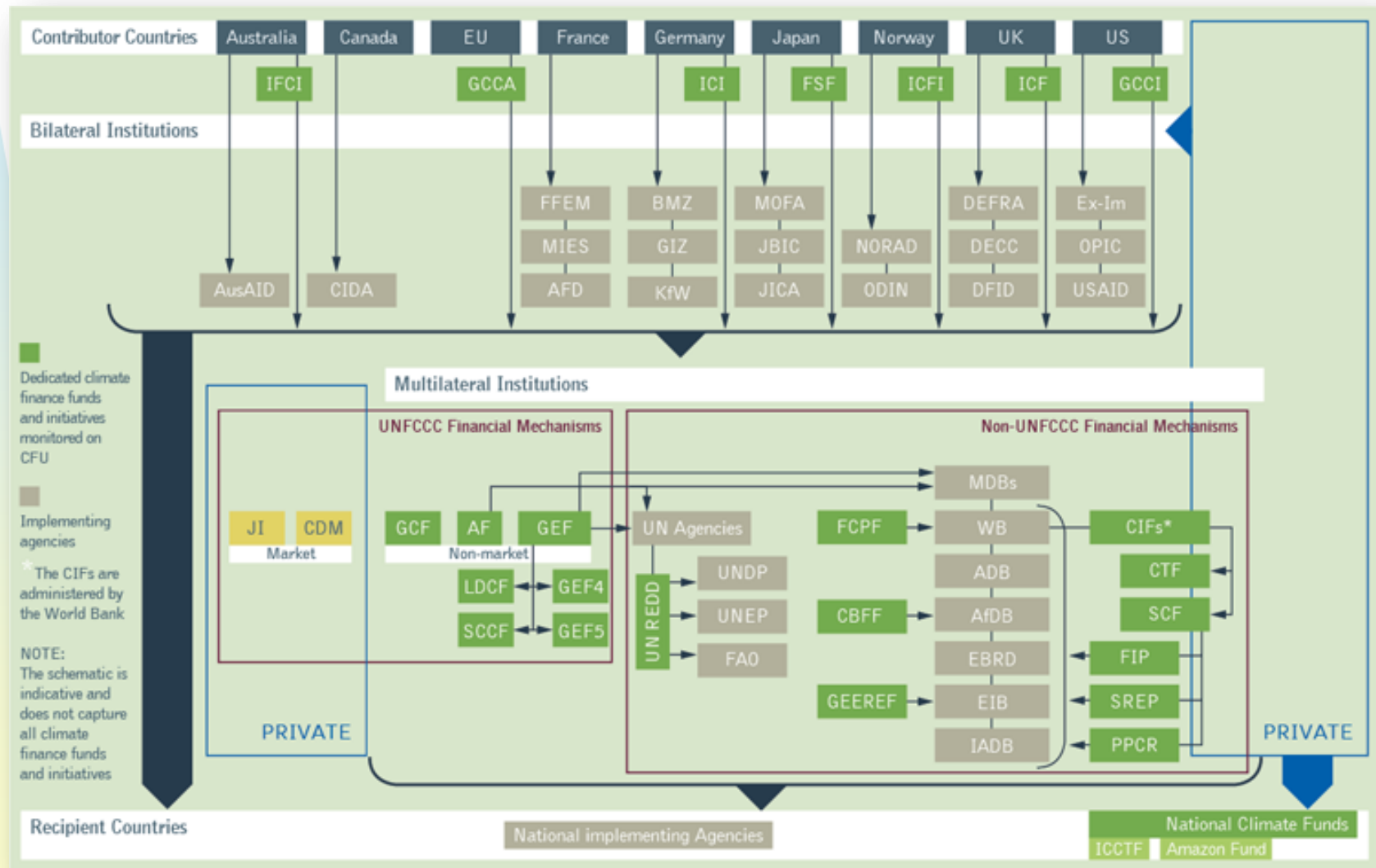
Important knowledge gaps regarding climate change impacts and climate change adaption

- While many **scientific findings, methods and data** are well documented and are available at very low effective costs, their **implementation is still far from optimal in many countries** ;
- In the MENA region, there remains a **large gap in the scientific capacity** to analyze data, interpret results and develop models and tools that fit stakeholder's needs ;
- In general **policy-makers are not well aware of climate change** and related impacts at both global and regional levels, Their sector and specific level impacts knowledge is less clear ;
- There is a **gap between the scientific community and extension workers** that are in charge of transferring climate change information to stakeholders and help in implementing adaptation strategies ;
- There is a **lack of effective national governance** in promoting the use of climate information for coping with climate change issues.

Financial mechanisms and tools to address climate change

- All **countries of the MENA region** are classified as Non-Annex I countries by UNFCCC and **are eligible to receive financial support** ;
- **The architecture of global climate funding is very complex.** Finance is channeled through multilateral funds, bilateral channels and national climate change funds ;
- **The complexity and the proliferation of funding sources and channels are challenging for recipient countries** to accessing adaptation and mitigation finance despite the urgent needs to face up to climate change

Financial mechanisms and tools to address climate change



<http://www.climatefundsupdate.org/>

Addressing climate change in MENA mountain regions

- The **capacity of countries to attract investments** and to implement adaptation policies depends mainly on their **overall economic status and governance, and the level of their research institutions** ;
- The **role of financial services and their accessibility by rural people** are also critical elements of climate risk management ;
- In the MENA region, there is a **need to strengthen capacities of national research & development institutions**, in order to understand the probable biophysical, economic and social impacts of climate change ;
- **A regional partnership is essential** in order to fill the gap regarding climate change impact assessment and climate change adaption, as many mountains cross MENA countries and as many of their vulnerabilities are trans-boundary and common ;
- Strategies to cope with climate change can only be achieved with **stakeholder involvement**, as human activities have become important drivers of global environmental change ;

Addressing climate change in MENA mountain regions

- Some **efficient technologies and measures have been already developed** to reduce the vulnerability of the ecosystems, as climate change has already happened in many of the MENA countries ;
- **A significant volume of knowledge** about climate and agriculture is currently available worldwide and **could be converted into action**, if adapted locally and communicated to various types of users ;
- In the mountains of the MENA region, **traditional knowledge is an important element of climate risk management**, and could provide a basis for effective strategies ;
- Both successful technological improvements and local practices could be already disseminated to speed up the rate of adaptation.

Prioritized agenda for advancing knowledge of climate change impacts and adaptation in the MENA mountain regions

- **Strengthen the Mountain Partnership constituency** in the MENA Region as a mechanism to increase awareness and promote action in support of sustainable mountain development and adaptation to Climate Change ;
- **Create a regional information management mechanism** for collecting, processing and exchanging observations and scientific data and for using climate-related information ;
- **Promote the drafting of projects** that target the needs of MENA countries, particularly those currently least able to provide climate services ;
- **Develop strategies for resource mobilization** (multilateral: GEF, UN-REDD, Forest Carbon Partnership Facility, Global Energy Efficiency and Renewable Energy Fund; bilateral: many developed countries; national funds), and capacity building programmes ;

Prioritized agenda for advancing knowledge of climate change impacts and adaptation in the MENA mountain regions (Cont.)

- **Develop an advocacy and communication strategy** targeted at policy and decision makers ;
- **Develop consistent and comparable climate scenarios and impact assessment** within and between countries in the MENA mountain region ;
- **Develop regional economic models**, taking into account environmental, demographic, economic, and political driving forces, under different regional scenarios of climate, land use, human demography, and external forces ;
- **Conduct demonstrative adaptive management measures in pilot sites**, based on successful “best practices” in the MENA mountain regions.

Thank you

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