

---

IUCN Mediterranean Regional Roundtable - Athens, Greece, December 10-11, 2002

## **The Impacts of Climate Change on Water Resources and Wetlands in Morocco**

Prepared by :

Prof. Jamal ALIBOU, Centre d'Etudes et de Recherche sur les Systèmes Hydrauliques et Environnementaux, Morocco

### **Summary**

Water resources in Morocco are not only particularly limited but also subject to extreme cyclic variations (i.e. a succession of acute drought cycles).

A rising water demand created by the rapid increase in population, improvements in living standards, industrial development and the extension of agricultural land by irrigation is leading to a constant pressure on this already scarce resource. Such pressures on water resources are linked with a growing and increasingly serious decline in water quality.

Pollution, soil erosion and soil transport are the main constraints hindering the rational management and sustainable development of water resources in Morocco.

National wetlands are under intense man-induced pressures as a result of their accessibility, their inherent significance for local populations and their enormous biological wealth. Wetland degradation is mainly caused by:

- ✓ Drying out, loss and transformation of habitats,
- ✓ Loss of functions, ecological qualities and biodiversity,
- ✓ Impacts related to natural drought.

Seven general circulation models (GCM), based on the average IPCC (IS92a), with an average climate sensitivity and the SCENGEN network, have been examined for climate simulations on the 2020 horizon. The results of the forecasts for the country as a whole point at:

- ✓ A net trend towards warming by between 0.7°C and 1°C,
- ✓ A trend towards drops in annual rainfall averaging 4%,
- ✓ An increase in both frequency and intensity of droughts in the south and east of the country,
- ✓ A disruption in seasonal rainfall.

The already critical status of Morocco's water resources may even eventually become a barrier curbing any form of development. The climate change forecast would have disastrous consequences, both direct and indirect, on water resources potential, not only in terms of quantity and quality but also of water needs and efficient use of this resource for different purposes. Ecosystems will have to cope with temperatures and rainfall patterns that are very different from those recorded today. Future changes in national climate conditions combined with future increases in sea level will also alter water availability and will exert a strong influence on the nature and function of certain Moroccan wetlands, including on their hosted plant and animal species. Such changes are likely to affect water birdlife whose habitat is currently provided by the country's wetlands (classified as important world sites by the Ramsar Convention).

On an institutional scale, management for the water sector is shared by the Ministry for Public Works & Development, responsible for water resources distribution, management and planning, by the Ministry of Agriculture, who is the main user and manager of wetlands, and by the Department for the Environment, responsible for drawing up laws and regulations on waste. Indeed, the lack of co-ordination between the

various ministerial departments involved is creating a major constraint on the implementation of development plans. Through adjustments in the institutional framework, the Government should ensure the enforcement of legal provisions for water and encourage interdepartmental co-ordination as well as active involvement in the planning and implementation of programs. Such interministerial co-ordination should be entrusted to the Department for the Environment.

Morocco has always respected and complied with the fundamental rules governing international co-operation. As a result, Morocco ratified the three conventions stemming from the Rio Summit Process in 1995. These conventions address several topics linked to climate change such as biodiversity and the fight against desertification (the Department for the Environment is the national body responsible for these conventions). Morocco also ratified the International Ramsar Convention in 1980 where the Ministry of Agriculture is the core national body.

Both the ratification of these conventions and all the efforts made to comply with their provisions reflect the country's good will to make an effective contribution to world efforts towards environmental protection and sustainable development. To date, however, as Morocco has been unable to benefit from the synergy that their implementation in common may generate, but is now determined to set up appropriate structures capable of implementing decisions arising from negotiations on these conventions.

The partial survey on vulnerability and adaptations to the impacts of climate change, conducted within the framework of preparations for Morocco's maiden speech at the UNFCCC, puts forward the forecasts for 2020 for certain determining variables, i.e. in terms of quality for the environment sector and the socio-economic context; and in terms of quantity for the water and agricultural sectors. This initial diagnosis has given rise to a dozen projects for adaptation in the water and agricultural sectors as well as a further seven linked projects (see table n°5, Annexes). Relief from the impacts of climate change on the country's water resources and wetlands can only be achieved if adaptation programs are set underway as soon as possible. Morocco has given high expectations to the provisions to be adopted by the international community on the issue of adaptation to climate change. Morocco is determined to contribute actively towards the implementation of a suitable funding mechanism for adaptation projects in Non-annex 1 countries.

In itself, the process that has led Morocco to draw up its first speech thanks to GEF projects, has also entailed a process of strengthening Moroccan capabilities on climate change. Significant progress has been made. Now, following the 7<sup>th</sup> COP hosted by the country, it is up to Morocco to contribute towards implementation of the Convention, in line with the principle of joint, but clearly differentiated responsibility. It also means that Morocco must now prepare in particular for adaptation to potential impacts of climate change on the environment and on the different social and economic sectors.

Morocco must secure the availability of certain management skills to ensure that the problems involved in climate change are built into sustainable development policies, such as:

- ✓ Capabilities for the analysis and formulation of response policies,
- ✓ Capability to select from alternatives under conditions of extreme uncertainty,
- ✓ Capability to recommend certain measures and to match them with the country's socio-economic and political reality.

Technological and financial means must be made available to enforce any policies issued in response. This is why Morocco has drawn particular attention to strengthening capabilities and technology transfer as core measures to ensure the implementation of United National Conventions and Protocols.

Such strengthening of capabilities and technology transfer can only be achieved through strong regional co-operation and partnership.