

Brief talk of Prof. Scoullos on the occasion of the Water Day 2021 at the virtual Conference “When Waters Speak” (10:30-12:00 CET, 22 March 2021).

What are the impacts of climate change on ecosystems and people who depend on rivers in Mediterranean mountainous areas?

Greetings from Athens, Greece to everybody,

Allow me please to start by observing that people and ecosystems that depend on the rivers, with sources in mountainous areas, are not only those in mountains but also all those downstream.

Allow me also to note that apart from the river Nile, almost all other Mediterranean rivers are located in the Northern and Eastern part of the Mediterranean. Because of the high slopes, the mountainous parts of these rivers are rather short and, in these parts, most of the river springs are found.

Many of the springs, even in southern latitudes (e.g. in Crete) are related to the snow or ice caps that cover the higher summits of the mountains during winter, while in the Nile (despite some scientific controversies) the sources are connected to the glaciers that have been dramatically reduced over the last decades.

In the entire Mediterranean we have experienced the climate change impacts more than in most other parts of the world. We have just concluded not only the 2nd hottest decade on record, during which the title for the hottest year was beaten eight times, with unprecedented frequencies and severity of climate and weather extremes, which increased beyond predictions.

These extremes in the Mediterranean mountainous areas include devastating droughts, extensive forest fires of important forests and heatwaves damaging the vital plant cover and many terrestrial and aquatic ecosystems. Under the high temperatures and abrupt changes, the ice and snow cover of mountains becomes thinner, lasts for shorter periods, becomes mechanically fragile and fragmented and melts rapidly resulting to fertile soil erosion, contributing to desertification, large scale downstream floods, silting of dams and destruction of ecosystems because of longer dry periods and droughts and rapid increase of suspended solids and unconsolidated sediments in lakes and wetlands.

Mountainous agriculture and cattle breeding for milk and dairy production is becoming much more difficult, mountainous sport d’hiver, skiing etc. (which is much more important than many non-Mediterraneans might think) has been dramatically affected. In many cases winter resorts in order to survive have adopted high energy and water consuming adaptation to climate change practices such as employment of “snow cannons” to keep their businesses in winter and increased air-conditioning in summer, backfiring climate change mitigation measures.

While unemployment is increasing, rapid devaluation occurs in winter mountainous houses, hotel properties and businesses, in general.

The Hydria Virtual Museum of MIO-ECSDE contributes through study and promotion of water education and UNESCO efforts for awareness on climate change linked to the Water-Energy-Food-Ecosystems Nexus as well as of the century old and modern adaptation of rain and storm water harvesting systems. This is done through **on the one hand**, with our programme and network

MEdIES of 6000 educators throughout the region and **on the other**, in close cooperation with GWP-Med which has installed more than 120 water reservoirs of small and medium scale and other non-conventional water systems in Greece, Cyprus, Malta and Sardinia.

Recently, GWP-Med has installed in a mountainous area of North Greece an innovative system which allows the substantial increase of the storing capacity of an existing dam to keep the storm water upstream, preventing downstream floods and meeting the increasing needs of the city of Alexandroupolis while securing the ecological flow of the river and the relevant ecosystems throughout the year.