

The role of science in the Water Convention

Pedro Cunha Serra



WATER
CONVENTION



The convention is on water, water quantity, water quality, surface waters mainly, but also on water uses and infrastructures (even if these are mentioned only once in the whole convention).

Infrastructures are very relevant because if we want to somehow ensure compliance of the law, we need to have the tools for controlling flows, protect water quality and so on.

Infrastructure are part of the problem (they allow for water uses and flow control) but they are also part of the solution (they can be used to ensure the equitable and reasonable use of the waters).

And this is something that requires scientific skills from some of those involved.

Water in nature abides only to natural laws that are acknowledged by the scientists: law of gravity, law of conservation of mass, of momentum, of energy.

And, because of the **random nature of rainfall** and other meteorologic events, flow events such as floods and droughts also need to be considered and studied from a statistical point of view, not a deterministic one, which adds **complexity to the task of managing water in rivers, be it national or transboundary rivers.**





We only manage what we know,

and to know the water that is flowing in the rivers we have to **monitor river flows continuously** (upstream, downstream) so as to take into consideration natural irregularity (seasonal, interannual) of river flows.

And because we need to have a **sound basis for any agreement between riparians**, monitoring must start as soon as possible and be in place for many years before any conclusion might be taken out of the information collected and analyzed.

Climate changes add complexity to the task, as flows become less random and start to show trends along the time (the use of the so-called moving averages shows this).

Metering flows in rivers is in itself a complex task, as river sections change because of erosion and deposition of sediments and rating curves need to be regularly calibrated, which is an expensive and complex task itself.

And rivers are fed not only by rainfall but also by waters coming from aquifers, in some cases many, many miles away from where they entered the aquifer.

Metering these exchanges of water between rivers and aquifers is even more complex, requiring much information, not only on surface waters (the easy part of the equation) but also on groundwaters, which is much more complex, requiring many data and intensive monitoring (on the nature of the aquifers, level of groundwater table, flux of these waters) and modeling.



Then we have the environmental issues which also require some scientific skills of some complexity. We are talking of living creatures, large spaces, biologic heritage that needs to be protected.

This is a completely different category of issues and expertise being required. Complexity is such that different languages are used to express the evaluation of the same situation by biologists and engineers, not to say jurists and diplomats.

Data coming out from monitoring comes with errors and this must be taken into account.



Exchange of information (of upstream and downstream metering, for instance) may contribute to reduce the margin of error and promote the goodwill for cooperation.

The same with cross inspection and communication of projects and planned measures.

Scientists have a common language and scientific laws do not need to be ratified by the Parties!

Because of all this, implementation of water conventions requires close cooperation between diplomates, jurists and scientists, each one bringing his expertise to illuminate the way forward. Some solutions that are required by some parties may not be feasible because of legal reasons (for instances if the equitable and reasonable principle is breached), other may not be possible for technical reasons (not enough water, not being possible to regulate the flows in absence of reservoirs).

Teams of experts with all these skills are needed to manage transboundary water courses and law enforcement.

For engineers $2+2=4$ always, but eventually
this is not the case for jurists!



Many thanks for your attention

