

# LEWAP Tuesdays


## Research and general public meeting

Conference Report Tuesday 15 December 2020

### I- HYDROLOGIE DES B.V. MEDITERRANEENS

#### i. Frontières

- Administrative
- Climatique
- Agro-bioclimatique
- Hydrologique/ Topographique



## Hydrology and management of Mediterranean watersheds and legal discussion of the watershed management in Lebanon

**Dr. Antoine Allam:** water resources expert, Montpellier SupAgro, ESIB USJ

**Georges Gharios:** Agricultural engineer, PhD candidate in Water Law at the University of Dundee in Scotland, Expert on the topics of water rights and usages in Lebanon and in the Levant

## SNEAK PEAK INTO THE PRESENTATIONS

### HYDROLOGY AND MANAGEMENT OF MEDITERRANEAN WATERSHEDS:

Dr. Antoine Allam presentation focused on the hydrology and management of Mediterranean watersheds. An overview of the hydrological functioning of watersheds in the Mediterranean and Lebanon was followed by a description of the water resources distribution and availability, watersheds spatial and temporal evolution, and perspectives on Mediterranean watersheds management.

Dr. Allam highlights that Mediterranean water resources available in this region are now, more than ever, exposed to continuous increasing demand for agriculture, industry, tourism, urban and demographic development, and climate evolution. This presentation that reflects the results of his PhD dissertation, aims to characterize Mediterranean catchments areas

Four objectives motivated the quest for a specific Mediterranean hydrology:

- The first consists of collecting an inclusive hydrological database including with the hydrological boundary as the project area.
- The second to establish a new high-resolution climatic classification for hydrology purposes based on Mediterranean specific climate indices like precipitation seasonality and aridity.
- The third, to carry out a physiographic classification of all Mediterranean catchments based on landform, landcover and soil indices to highlight Mediterranean variability.
- The fourth, to carry out an extensive water balance analysis of 55 Mediterranean catchments based on different water balance functional models as advanced by L'vovich (1979) and elaborated by Ponce & Shetty (1995a, 1995b) and Sivapalan et al., (2011) to check the hydrological variability and similarity between all catchments and between same climatic and/or physiographic classes catchments.

The climatic classification into 5 classes coincided with a geographical distribution in the Mediterranean ranging from the most seasonal and dries CC1 in the south to the least seasonal and most humid CC5 in the North. The classes located to the north are slowly evolving towards moderate coastal classes which might affect hydrological regimes due to shorter humid seasons and earlier snowmelts.

The physiographic classification and analysis provided a unique overview of Mediterranean catchments, mainly landform which revealed the existence of a micro-climatic variability, shadowed by the macro climate homogeneity. This micro-climatic variability is the main reason behind natural landcover variability like different tree cover. The water balance analysis highlighted the Mediterranean trend aligned with the general climatic setting. In fact, the climate is the main driving force of the Mediterranean hydrology, however, it is not the only one as the hydrological homogeneity was identified, under different climates, for the mountainous karstic and snow influenced catchments

which yield the highest base flows and runoff coefficients. Catchments scatter and classes have drawn closer to the moderate Mediterranean catchments, with karstic and snow influenced catchments staying as the highest yielding catchments.

The alerting climatic and anthropogenic impacts call for urgent adaptation and mitigation measures that should be included in future national strategies and water resources management plans and that should be more based on regional research by deepening the knowledge on the spatial and temporal variability of hydrological resources all over the Mediterranean.

To know more about this study, check the [link to the presentation](#)

## **LEGAL DISCUSSION OF WATERSHED MANAGEMENT IN LEBANON**

Georges Gharios focused on the legal aspect around watershed management in Lebanon. A historical overview was followed by an analysis of the texts relating to the subject within the new Water Code with key points to retain on the current and future perspectives of watershed management in Lebanon.

Mr. Gharios started his presentation with a small brief on the historical overview of legal approaches to water management in Lebanon showing the management schemes before and after law 221/2000. He continued by explaining the management process of watersheds as issued in Lebanon's Water Code.

Lebanon's Water Code presented new approaches for better water management in the country such as the establishment of a national water council, the 'pollueur-payeur' concept, the introduction of water police, water register and Water Users Associations. The Code also introduced two types of instruments for a better management of watersheds: the general water master plan and the watershed management contract. These contracts were inspired by the French model for watershed management based on a decentralized approach while providing power to the government. The Water Code is also inspired by the French model on the Public-Private Partnership (PPP).

Furthermore, Mr. Gharios presented the new approach that was introduced through the Water Code known as the Public-Public Partnership that allow municipalities to partner up with water establishments for water services in their respective areas (given that law 221/2000 states that Water Establishments are the main authority responsible for the service). He also showed the role of governmental and non-governmental organizations under the Water Code.

Mr. Gharios concluded his presentation by providing his insights and personal ideas regarding the coordination issues among water actors, the ambiguous role of

municipalities in wastewater management and the institutional duplication of roles and responsibilities in water and wastewater services in Lebanon.

To know more, check the [link to the presentation](#)

## DISCUSSION BETWEEN THE AUDIENCE AND THE SPEAKERS

**Why will the  $K_r$  (total flow coefficient) increase in the next century, but the max  $K_r$  will decrease, which seems to go the opposite of an increase in aridity and seasonality?**

This  $K_r$  value is the average  $K_r$  values of the whole Mediterranean basins – 1270 basins; the Southern basins increased the runoff coefficient due to a slight increase in precipitation however, the Northern basins reduced the runoff coefficient, this led to an increase in the average  $K_r$  value.

**Are there any ancient traces on water management, such as the drip developed by the Nabataeans?**

Drip no, but we have plenty of ancient traces of dams, distribution, allocation - we know that the Romans passed through there, the Persians and the influence of the peoples of ancient Mesopotamia like the Assyrian people

**Who owns the groundwater resources?**

In Lebanon, the state owns all the waters in the country; but we have four exceptions uncontrolled by the state: rainwater, acquired rights, springs that have a small flow and permits

**Are there municipalities that are taking over private water management, as in Grenoble and in many small municipalities in France?**

no we have the opposite situation, there were municipalities which had a private water management like Der El Qamar and Baakline but now law 221/2000 obliges them to pass the responsibilities to the water establishments

**How does the water code adapt to refugee camps, Syrians for example in the Bekaa?**

The Water Code does not address the situation of refugees, as per my knowledge – said Mr. Gharios

**Since there is a dynamic between land use planning and surface water, do you find that it is necessary to revise the regulations dating from the French mandate, in order to be able to develop both water and soil to prevent soil degradation, and restore water quality?**

Yes indeed we should have revised the old laws and in order to prevent this degradation, the water police should be functional (the water police is mentioned in the updated Water Code and should be a local citizen) to monitor and control any violations on river streams and basins.

**Does the new water code mention the possibility of creating management committees for watersheds? If this is not the case, what would be in your opinion the key actors who should compose a management committee for a watershed in Lebanon if we consider the content of the new water code?**

The Water Code mentions the possibility of creating watershed management committees but those should be managing small scale watersheds; the best approach to a better management of river basins and watershed is the participatory approach which is reflected in the watershed scheme that consists on grouping users, municipalities and elected personnel – an approach learned from the French.

**How does the issue of groundwater management fit into an Integrated Water Resource Management Plan? Which institution (s) is best prepared to deal with the problem of the availability of groundwater and its quality?**

For an integrated management plan, it is essential to consider groundwater as well. Water resources were already quantified – those of importance – the Litani River Authority is in charge of that and they have installed different stations along the river basin. Concerning groundwater resources in Lebanon, there is an ongoing study that will assess the quantity and quality of water. The best approach would be to create a committee at the level of the Ministry of Energy and Water responsible of the monitoring process of water resources.

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**I- HYDROLOGIE DES B.V. MEDITERRANEENS**  
iv. Régimes hydrologiques

Classification de Haines (1988)

- Group 1 : Uniforme
- Groupe 11: Automne modéré
- Groupe 12: Hiver modéré (Nord)
- Groupe 13: Hiver extrême (Sud)
- Groupe 14: Début printemps

**G12 (21)**

Ratio de l'évaporation annuelle

40%  
30%  
20%  
10%  
0%

Sep Nov Jan Mar May Jul

**Haines Flow Regime**

- Group 1
- Group 11
- Group 12
- Group 13
- Group 14

Hydrological Boundary  
Mediterranean Countries


Map labels: France, Spain, Italy, Monaco, Slovenia/Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece, Turkey, Cyprus, Lebanon, Egypt, Libya, Tunisia, Algeria, Gibraltar, Malta.

Zoom Meeting interface: You are viewing antoine allam's screen, View Options, Participants (24), Find a participant, Mute All, End.


Figure 1: Presentation of Dr. Allam



Zoom Meeting You are viewing Georges Gharios' screen View Options



Jasmine El K...



Georges Gharios


antoine allam

B

Bernard BAR...

Laurent Charlet

**Participants (24)**

- JE Jasmine El Kareh (Host, me) 🔊 🗨️
- GG Georges Gharios 🔊 🗨️
- AT Alexandre TOURBAH 🔊 🗨️
- AA antoine allam 🔊 🗨️
- BJ Bassam Jaber 🔊 🗨️
- B Bernard BARRAQUE 🔊 🗨️
- CE Chanel el hifnawy 🔊 🗨️
- CF Colin Ferrari 🔊 🗨️
- CG Cynthia Gharios 🔊 🗨️
- ED Elena Diato 🔊 🗨️
- FK Farid Karam 🔊 🗨️
- GM Grisell Medina Laguna 🔊 🗨️
-  Heinz-Peter Mang 🔊 🗨️
- I idar 🔊 🗨️

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## PLAN

- I. **Aperçu historique des approches légales a la gestion de l'eau au Liban**
  - Gestion décentralisée et offices de l'eau avant 1999
  - Introduction des Etablissements d'eau et Gestion centralisée depuis 2000
  - Etats des lieux actuels
- II. **La gestion par bassin versant dans le Code de l'eau et son application**
  - Les schémas de bassin et les contrats de milieu
  - Partenariat Public-Prive
    - Rôle des ministères et Etablissements des eaux pour améliorer la gestion par bassin versant
    - Rôle des citoyens
- III. **Perspectives sur l'aspect légal de la gestion des bassins versant au Liban**
  - Duplication institutionnelle et fragmentation des responsabilités
  - Des ambiguïtés maintenue
  - Points-clefs a retenir
  - Etude de Cas

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Figure 2: Presentation of Mr. Gharios