

The beginning of modern hydraulics in Tunisia

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Background

The first weather observations in Tunisia date back to 1875, they were carried out under the supervision of the Meteorology service of Algiers.

With the event of the French protectorate, the Service of military health extended the climatology network in 1883 to Kairouan, El Kef, Sousse and Gabes.

The Tunisian meteorology service was set up in 1885 by the General Director of Education and observations were extended to cover Bizerte, Sfax, Jerba, El Jem and Tozeur.

In 1889, a meteorology committee was set up by virtue of a decree and was in charge of coordinating the work carried out by all services : maritime, public works, hydrography. In the same year, the meteorology service was attached to the Department of public works. In 1893, it came under the Department of education. From 1898 to 1900, it was attached to the Department of agriculture, from 1901 to 1923, it came back under the Department of education and then under the Department of public works in 1923. It should be mentioned that this service has known since 1894 only one Director, called Ginestous public works engineer, for 36 years.

Measuring the flow rate of rivers started in 1925 with the Medjerda in Bou Salem and the Kebir in Sidi Aouidet. In 1926, the Joumine-Mateur hydrometric station was installed; in 1932, the Madeleine station over the Meliane wadi and the K13 over the Mellegue wadi were installed and in 1939, the Cheylus station was put up over the Meliane. The first station in central Tunisia dates back to 1949 in Sidi Saâd.

The first milestones of the hydraulic policy

The major concern of the French colonization was to know about the Tunisian climate. A note dating back to 1889 was followed in 1906 by a complete study on the Tunisian climate. Interpretations of the first observation series made it possible to draw up the climatic outline of the new colony.

The knowledge about the physical environment (geography, hydrography, geology, vegetation, water quality...) was also a major concern that is why the first maps of catchment basins were rapidly drafted with the assessment of surfaces, the lengthwise layout of water courses This knowledge was aiming at determining the hydraulic potentials in Tunisia in order to develop the agricultural sector. After the setting up of farming associations in 1897 and two decades of private initiatives, the agricultural hydraulics policy had been centralized since 1920 and the general program of agricultural hydraulics dates back to 1930. An inventory of Tunisian hydraulics was drawn up 1941 by Gosselin, such inventory represents the continuation of the first document drafted on this matter in 1912 entitled « Hydraulics issues in Tunisia ».

In 1933, hydraulics associations were set up ; their geographical distribution reminds the current distribution of the Regional Agricultural Development Authorities (CRDA). Works on irrigation, spreading of floods, purification of farming lands and water researches were carried out within these associations. In 1931, a water catalogue was drafted listing all water points, possible dam locations, rivers and flow rates and

indicating, for underground water resources, the geological sections, tests on flow rates and levels of ground water. It represents the ancestor of the current hydrology database relating to the project” Water economy 2000”.

The rural development plan presented by Gosselin is also the predecessor of the Master plan for Central waters. We should mention that said plan showed the particular concern regarding the conservation of soil and water resources through the fight against erosion (an issue already mentioned by Ginestous in 1912).

The mobilization of resources was done systematically taking into account the complexity and interaction of all considered factors.

Classification of concerns into categories

Documents existing in the library of the Department of water resources which were published before 1968 may be classified into following categories :

Rains

Statistical measure-analysis,
Torrential rains (since 1938),
Artificial rains (first trials started in 1948),
Rains cartography,
Study of intensities .

Rains violence and uneven space distribution was noted as soon as the beginning of these weather studies. The first comments on drought were made by Ginestous in 1914.

Evaporation

The first document seems to be the one drafted by Lacroux in 1932 followed by a second one in 1936. A first region-based classification of the hydric balance was carried out by Préciosi in 1954 including the results of measures obtained since 1900 using the Piche evapometer. The application of the ETP formula, put forward in 1948 by Thorwaite, was assessed in 1954 by Tixeront.

Erosion

The first studies date back to 1938 and concern the retention of runoff waters. The experience of small villages in the Sahel and around Matmata were analysed in order to take advantage of it for the project of extending the Sfax olive grove. Tixeront's book is a reference in this field as it shows the importance of cultivation practices in the fight against erosion. Poncet's book deals also with this subject. Experiments on rain simulators started as soon as 1963. A first erosion assessment was done in 1957. As for plot experiments, they started in 1963.

Runoff and floods

Studies on floods started in 1931. The assessment of runoff waters in controlled catchment basins was the object of the report drafted by Berkaloﬀ in 1953. Afterwards, Tixeront in 1958 and Chaumont in 1963 suggested regional empiric formulas. The refill of ground water through infiltration channels has been considered since the fifties for example in Souhil wadi- Nabeul. It should be mentioned that these studies often used air photos.

Saltiness

During the fifties, several reports dealt with salty soils and chotts. The results of a survey on the medjerda saltiness were published in 1959.

SCIENTIFIC ASPECTS

Documents show that surface hydrology in Tunisia was practiced in a modern way. Carried out works were at the basis of several publications in national and international magazines, such as:

Reports of the Academy of Sciences (Bois, 1938),

AISH's reports (Lacroux, 1936) (Tixeront et Berkaloﬀ, 1957).

French Hydrotechnics Society (Tixeront 1956),

Geography annals (Poncet, 1969).

The Tunisian journal (Ginestous, 1914).

Considering the hydrology development throughout the world, we should mention the rapid implementation of recent analysis methods :

The use of statistical methods (thanks to Gumbel in 1958).

The use of rain-flow rate models and particularly the unit hydrogram thanks to Dooge in 1959 (this method was used for the Kebir's basin)

The use of computers as of 1968.

In limnology, the most recent and modern facilities were acquired and explaining notes were released.