Chapter 6
Water Crisis in Tunisia During the Anthropocene and Great Acceleration Wetlands as Key Sites of Hydrogeological Modifications

Elhoucine Essefi
Faculty of Sciences of Sfax, University of Sfax, Tunisia

Soumaya Hajji
https://orcid.org/0000-0002-6371-7223
LR3E, ENIS, University of Sfax, Tunisia

ABSTRACT

Due to overexploitation, anthropogenic pollution, and climatic change during the Anthropocene and Great Acceleration, Tunisia has already witnessed a severe water crisis. Since they are the natural outlets of their hydrological and hydrogeological basins, wetlands are candidates to obviously display the radical change in water cycles related to anthropogenic activities. This chapter provides efficient methods to investigate water cycle modifications through the study of the water budgets within wetlands (Sidi El Hani Discharge Playa, Eastern Tunisia was taken as example). As concrete manifestation of this change, the dryness of in water springs or the decrease of their flows are concrete indicators of a real water crisis in Tunisia. In addition, salt consumption leads to a decreasing salinization.

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INTRODUCTION

Due to increasing population, pollution and climatic changes during the Anthropocene and Great Acceleration (Hajji et al., 2018, 2020), Tunisia is one of the African countries threatened by sacristy of water resources. In the coming decades, Tunisia is candidate to face a real water crisis (Hajji et al., 2021). As a matter of fact, Anthropocene conditions would have serious repercussions deepening difficulties. On the one hand, climate change marked by decreasing rains along the country influenced the available surface water stoked within dams and artificial lakes (Wolanski and Hopper, 2022). In addition, the recharge of shallow aquifer decreased (Farid et al., 2022). On the other hand, due to an increasing population, which results in an overexploitation and pollution of surface and subsurface water resources, is related to the setting of the Anthropocene. During the Anthropocene and Great Acceleration, climate change and the subsequent environmental impact havebecome of particular international interest; it has an impact on water recourses collected in wetlands (e.g., Brinkman, 2021; TekadeRupali, 2021). As for the Tunisian context, the connectivity between groundwater and saline environments in the Tunisian Sahel area makes these bodies little more than a surface expression of the water table (Essefi, 2009; Essefi et al., 2013, 2014a). Thus, the impact of climatic variability during the Anthropocene and Great Acceleration in saline systems should be viewed within a framework of a combined groundwater-wetland system (Carol et al., 2022). This chapter is meant to gain an insight into the sensitivity of these systems to climatic change during the Anthropocene and Great Acceleration. Nevertheless, it will not predict discharge playa or groundwater environment global changes, nor will it predict how changes in climate will affect its entire hydrological cycle. Rather, it will provide an insight into how playas, which are strongly influenced by a regional salty groundwater flow regime, such as Sidi El Hani discharge playa, would respond to the increasing dryness taking place during the Anthropocene and Great Acceleration. That is to say, a reinforcing of the idea previously discussed in other works (Essefi et al., 2014b) of a strong deep influence of somewhere domes of salt and/or brinecoming from the Triassic and/or Messinian Salinity Crisis MSC formations located in the subsurface of the Sahel area.According to the proposed model, this dominance of the groundwater contribution may be increased by the installation of dams in the Tunisian center, which increases the convergence of Kairouan aquifer towards Sidi El Hani discharge playa; and hence increases its salinization. Here, we can find out the double contradictory effects of Anthropocene and Great Acceleration changes. On the one hand, arid conditions enhance the scarcity of water resources and salinization within wetlands. On the other hand, dams setting (especially during the Great Acceleration) decreases water collected from its hydrological basin and increases water collected from its hydrogeological basin.

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