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Desalination in Morocco: status and prospects

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ABSTRACT

Morocco, like other the Middle East and North Africa countries, is a water-scarce country confronted with dwindling groundwater reserves, due to climate change impact, and a strong dependence on rain-fed agriculture. Thus, sustainable water resources management is a top priority in the national strategy. Seawater desalination was considered as one of the possible responses to satisfy the water demand of overcrowded coastal towns. The greatest constraints of seawater desalination remain its energy consumption per cubic meter of produced water and the environmental impacts due to the discharge of brines into the natural environment. Despite the many advantages of desalination, its environmental impact, therefore, remains a major concern. Its advantages and drawbacks must be assessed in terms of costs and benefits, societal and environmental aspects, and compared to other freshwater production processes. The objective of this work is twofold. Firstly, the objective is to present thoroughly a bibliographic study on water desalination by highlighting the problems related to energy consumption, fouling and brine management. With an aim to provide an insight on the cost of desalination, this review collates different research studies which evaluate and compare the economic cost of the produced water by three based-membranes processes, nanofiltration, reverse osmosis and electrodialysis, for seawater and brackish water desalination. The second objective meant to review the Moroccan experiences on seawater and brackish water desalination with the technologies used and their operating status. This part of the study is done through synthesis and analysis of expert reports established in the desalination field, which are consulted in the context of the bibliographic research. Finally, this review also focuses on the Moroccan experience in the use of unconventional water for irrigation, with a particular emphasis on the Agadir desalination plant.

Keywords: Morocco desalination plants; Economic cost desalination; Reverse osmosis; Membrane; Renewable energy; Brine management; Seawater; Brackish water; Unconventional water

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