



Life cycle assessment of water and wastewater treatment systems: Case of Morocco
Najoua LABJAR¹, Souad EL HAJJAJI², Loubna El Joumri¹

¹. CERNE2D, ENSET, Mohammed V University in Rabat, Morocco, najoualabjar@hotmail.com,

². CERNE2D, FSR, Mohammed V University in Rabat, Morocco.
najoua.labjar@um5.ac.ma

Abstract

It is clear that the Earth's climate has undergone many changes in recent years, mainly due to warming caused by greenhouse gases. Among the consequences of these changes, several subsequent studies have focused on the following [1-2]:

- The increase in temperature,
- Decrease in precipitation and ice cap mass,
- The scarcity of water resources,
- Sea level rise.

Morocco has not been spared the impacts of these changes, which negatively affect most of its water resources. Located in north western Africa, this country is characterized by very significant spatial and temporal variability in precipitation. Several scenarios have been developed and studied, all converge towards the same conclusion, by the end of this century, Morocco will experience a considerable increase in the average temperature from 2.5 C to 5.5 C with a decrease in rainfall of up to 20% of the current volume [3-4].

In order to face all these constraints and with a view to socio-economic development, Morocco has adopted a policy based on the following axes [5]:

- Consistently satisfy all users;
- Promote solidarity in its various dimensions
- Ensure a good balance between water needs and resources;
- Ensure water conservation and protection.

The implementation of the last two guidelines already mentioned is based on rationalising the use of water resources. This rationalization could only be achieved by continuously increasing the number of water use cycles while monitoring environmental impacts along these cycles. The adoption of life cycle assessment is currently a fast-growing method throughout the world, in Morocco, no prior study of life cycle assessment of water and wastewater has been developed. The objective of this work is to present the steps of a life cycle analysis and its adoption for water systems and also situate water in the context of climate change in Morocco [6]. The results of a life cycle analysis for two types of units: wastewater treatment plant and drinking water production unit will also be presented. These results are deduced through the elaboration of indicators allowing the evaluation of the environmental impact of these units as well as their energy consumption.

References

- [1] IM.L. Parry, O.F. Canziani, J.P. Palutikof, P.J.V.D. Linden, C.E. Hanson, (Eds.), *Climate Change*, Cambridge University Press, Cambridge, UK, pp. 717–743, 2007.
- [2] E.A. Ainsworth, S.P. Long, *New Phytol.* 165, 351–372, 2005.
- [3] Zereini F., Hötzl H. (eds) *Climatic Changes and Water Resources in the Middle East and North Africa*. *Environ. Sci. Eng.*, pp. 179–195, 2008.
- [4] F. Fnguire, N. Laftouhi, M. E. Saidi, Z. Zamrane, H.El Himer, N.Khalil. *Theoretical and Applied Climatology*, n°130, pp. 321–330. 2017.
- [5] Low n°36-15 relating to water, Morocco.
- [6] N. Labjar, S. El Hajjaji, *Climatic change and life cycle assessment of water and wastewater treatment systems: Case of Morocco*, Exceed, Amman, Jordan, November 03-07, 2019.