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Impact of global warming on dissolved oxygen concentrations in River Nile and on the waste allocation plan of the river: Present and future plan

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The aim of this paper is to investigate the impact of global warming on River Nile water quality; especially on dissolved oxygen (DO) concentrations. The study is done on the Nile River in Egypt at three monitoring stations; namely at Luxor governorate, at Alexandria governorate and at the Capital Cairo. A mathematical model is constructed to simulate the DO concentrations at different water temperatures. The study investigates two scenarios; the critical DO concentration in summer (month August) where the Nile reaches its peak discharge in Egypt and the DO values in winter (month February) where the lowest discharge in the Nile in Egypt is reached. The study used air temperatures over the last 30 years to predict the values of water temperatures and DO concentrations for the period of years (2013-2030). Also the further effect of global warming on the location of water and waste water treatment plants on the river Nile was studied. It was found that the values of the critical DO concentrations decreased over the years according to the global warming effects: At Luxor it decreased in February by 3.99% and by 4.26% in August; In Cairo it decreased in February by 4% and in August by 4.8% whereas at Alexandria it decreased in February by 1.34% and in August by 5.16%. DO critical concentrations values decreases significantly with the increase of air temperatures. Also it was found that global warming has a considerable effect on the locations of the water and waste water treatment plants on the river and thus on the waste allocation plan

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