

## Improvement of Water Quality of Al Asfar Lake Using Constructed Wetland System

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**Abstract :** Al-Asfar Lake is located about 14 km east of Al-Ahsa and is one of the most important wetland lakes in the Al Ahsa/Eastern Province of Saudi Arabia. Al-Ahsa is may be the largest oasis in the world, having an area of 20,000 hectares, in addition, it is of the largest and oldest agricultural centers in the region. The surplus farm irrigation water beside additional water supplied by treated wastewater from Al-Hofuf sewage station is collected by a drainage network and discharged into Al-Asfar Lake. The lake has good wetlands, sand dunes as well as large expanses of open and shallow water. Salt tolerant vegetation is present in some of the shallow areas around the lake, and huge stands of Phragmites reeds occur around the lake. The lake presents an important habitat for wildlife and birds, something not expected to find in a large desert. Although high evaporation rates in the range of 3250 mm are common, the water remains in the evaporation lakes during all seasons of the year is used to supply cattle with drinking water and for aquifer recharge. Investigations showed that high concentrations of nitrogen (N), phosphorus (P), biological oxygen demand (BOD), chemical oxygen demand (COD) and salinity discharge to Al Asfar Lake from the D2 drain exist. It is expected that the majority of BOD, COD and N originates from wastewater discharge and leachate from surplus irrigation water which also contribute to the majority of P and salinity. The significant content of nutrients and biological oxygen demand reduces available oxygen in the water. The present project aimed to improve the water quality of the lake using constructed wetland trains which will be built around the lake. Phragmites reeds, which already occur around the lake, will be used.

**Keywords :** Al Asfar lake, constructed wetland, water quality, water treatment

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