ABSTRACT

Water is of immense value to all life on earth. The value of water is defined in its availability for irrigation, domestic, industrial, environmental flows as well as the benefits that the future generation will enjoy with the availability of water in the years to come. Healthy and unpolluted water systems drive the economy and important in alleviating poverty. Research has shown that the world surface temperatures are set to increase by 2℃ due to climate change. This increase in temperature will impact water availability as well as water quality. Freshwater ecosystems such as wetlands are expected to be impacted more through high evaporation rates and pollution. Similarly, human-induced factors in irrigation, urbanization and population growth are expected to put more pressure on the limited water resources. The effects of climate change will be severe in arid and semi-arid developing countries because of high evaporation rates and low precipitation that will cause repeated droughts. The UN reports that more than 2 million people reside in regions that are water stressed.

Botswana is one of the driest countries in Southern Africa and is home to the iconic Okavango Delta. The Okavango Delta is the world's largest inland delta that was listed under the UNESCO World Heritage site in 2014. The delta is formed when the Okavango River splits into different channels forming permanent swamps and islands over an area of about 12 000 square kilometres. The delta is popular tourist attraction site and sustains the communities that reside in the area through an endless supply of water, food and raw material. Just like all other regions, water in the Okavango Delta will be impacted by climate and human induced factors. To obtain an insight of the impacts of climate change and human activities on water quality in the Okavango River, WEAP was used to simulate future changes to water quality. Temperature, pH and EC for 2015 was used as the baseline data and 2030 was set as the target year. Although the catchment is relatively undeveloped, the planned construction of a hydro-power plant in Angola and a water carrier pipeline in Namibia, water flow in the Okavango catchment will decline and thereby impacting water quality. The results from the model indicate that water quality for temperature, EC and pH will be affected, especially pH levels at the lower channels. Continuous monitoring and research is necessary to keep track of further water quality changes that may occur in the system so that timely decisions could be made to protect the vulnerable water resources of the Okavango River Basin.