



Characterisation of flooding in Alexandria in October 2015 and suggested mitigating measures

Biswa Bhattacharya (1), Chris Zevenbergen (1), R.A. Wahaab R.A. Wahaab (2), W.A.I. Elbarki W.A.I. Elbarki (3), T. Busker T. Busker (4), and C.N.A. Salinas Rodriguez C.N.A. Salinas Rodriguez (1)

(1) UNESCO-IHE, Integrated Water Systems and Governance, Delft, Netherlands (b.bhattacharya@unesco-ihe.org), (2) Holding Company for Water and Wastewater, Cairo, Egypt, (3) Faculty of Engineering, University of Alexandria, (4) University Utrecht, Utrecht, Netherlands

In October 2015 Alexandria (Egypt) experienced exceptional flooding. The flooding was caused by heavy rainfall in a short period of time in a city which normally does not receive a large amount of rainfall. The heavy rainfall caused a tremendous volume of runoff, which the city's drainage system was unable to drain off to the Mediterranean Sea. Seven people have died due to the flood, and there were huge direct and indirect damages. The city does not have a flood forecasting system. An analysis with rainfall forecast from the European Centre for Medium Range Weather Forecast (ECMWF) showed that the extreme rainfall could have been forecasted about a week back. Naturally, if a flood forecasting model was in place the flooding could have been predicted well in advance.

Alexandria, along with several other Arab cities, are not prepared at all for natural hazards. Preparedness actions leading to improved adaptation and resilience are not in place. The situation is being further exacerbated with rapid urbanisation and climate change. The local authorities estimate that about 30000 new buildings have been (illegally) constructed during the last five years at a location near the main pumping station (Max Point). This issue may have a very serious adverse effect on hydrology and requires further study to estimate the additional runoff from the newly urbanised areas. The World Bank has listed Alexandria as one of the five coastal cities, which may have very significant risk of coastal flooding due to the climate change.

Setting up of a flood forecasting model along with an evidence-based research on the drainage system's capacity is seen as immediate actions that can significantly improve the preparedness of the city towards flooding. Furthermore, the region has got a number of large lakes, which potentially can be used to store extra water as a flood mitigation measure. Two water bodies, namely the Maryot Lake and the Airport Lake, are identified from which water can be pumped out in advance to keep storage available in case of flooding.

Keywords: Alexandria, flood, Egypt, rainfall, forecasting.