



Using remote sensing tools to assess the impact of climate change on freshwater scarcity in North Africa.

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North Africa is considered highly vulnerable to water scarcity and other environmental problems due to global warming. If temperatures in the region continue to rise at a relatively high rate, there could be less rainfall for agriculture and a deterioration in the quality of freshwater resources due to saltwater intrusion into freshwater aquifers and increased concentrations of pollutants. The drought of rivers and lakes in Egypt, Libya, Tunisia, Algeria and Morocco, which are already suffering and will continue to suffer, will lead to conflicts between different water users, which will be intensified in the future, as well as in regional economic and political instability. Some regions of the African continent are experiencing higher and less predictable rainfall due to global warming, increasing the risk of floods and landslides, while other regions are facing hotter, drier weather and longer droughts. All of these effects were proved by statistics of the local institutes (Please place here one literature references).

To achieve food security, protect biodiversity and maintain peace and stability, the Middle East and North Africa (MENA) region must adopt a climate-smart approach to agriculture and natural resource management. Meanwhile, the development of remote sensing and satellite technology is needed to study and monitor these phenomena. Understanding the relationship between greenhouse gas (GHG) emissions and climate change is crucial. The relationship between GHGs and the rhythm of changes in climate variables has been investigated using machine learning (ML) models based on ECVs (Essential Climate Variable). Data from meteorological and oceanographic satellites are now an essential tool for numerical weather and climate prediction and are directly assimilated by numerical models. Finally, spatial patterns of freshwater stress and scarcity need to be characterised to support initiatives in North Africa.