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## The Role of Data Analytics to Address Water Stress in Africa

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## Introduction

Water stress is a pressing global concern that surpasses geographical limitations, exerting its impact across the globe. While it exhibits diverse manifestations throughout different regions globally, its influence is notably significant across the African continent. Water scarcity affects 1 out of 3 people in Africa [1]. The adequate accessibility and effective governance of freshwater resources are essential for the overall welfare of ecosystems and human communities. This research aims to highlight the importance of data analytics in the sustainable water management in Africa, and potentially worldwide.

## Environmental Impact

- The reduction of water availability could change the flow pattern and present detrimental effects on ecosystems [2].
- An incorrect water stress might lead to desiccation of rivers and wetlands, and thus, have a significant impact on the migratory pathways of several wildlife species.
- Over extraction of groundwater has the potential to cause the intrusion of seawater in coastal areas.
- The ramifications of water stress are significant and have reached consequences that transcend beyond the immediate human population.

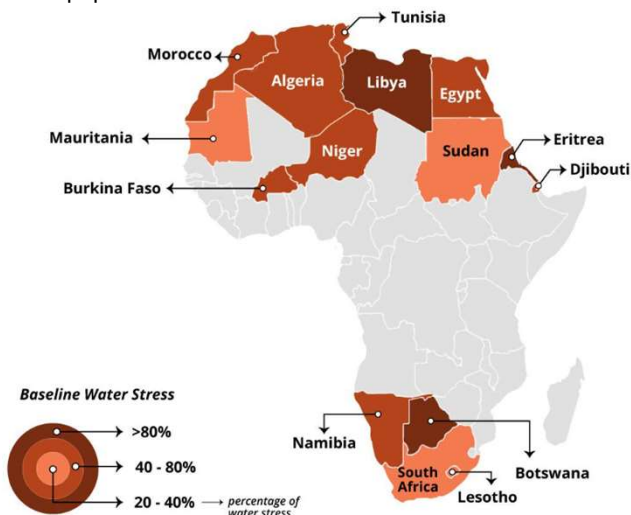


Fig.1.: Water stress in Africa [3]

## References

- [1] The Guardian (2022). Better use of groundwater could transform Africa, research says. [online] the Guardian. Available at: <https://www.theguardian.com/environment/2022/mar/21/better-use-of-groundwater-could-transform-africa-research-says>.
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- [3] Kuzma, S., Saccoccia, L. and Chertock, M. (2023). 25 Countries, Housing One-quarter of the Population, Face Extremely High Water Stress. www.wri.org. [online] Available at: <https://www.wri.org/insights/highest-water-stressed-countries>.
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- [4] Timothy C.C. Lui, Gregory, D.D., Anderson, M., Lee, W.-S. and Cowling, S.A. (2022). Applying machine learning methods to predict geology using soil sample geochemistry. Applied computing and geosciences, 16, pp.100094–100094.

## Methodology

- The methodological framework employed relies on the analysis of publicly available datasets.
- The main analysis is considering two key factors: the number of people in each country and their economical activity, since it is considered that these two variables influence the water demand.
- The objective of this analysis is to elucidate the factors contributing to disparities in water stress levels among various African countries using data analysis.

## Analysis and Insights

- Between the 6 countries with greater score in clean water, Morocco and Egypt are in the highest point in terms of water extraction levels [4].

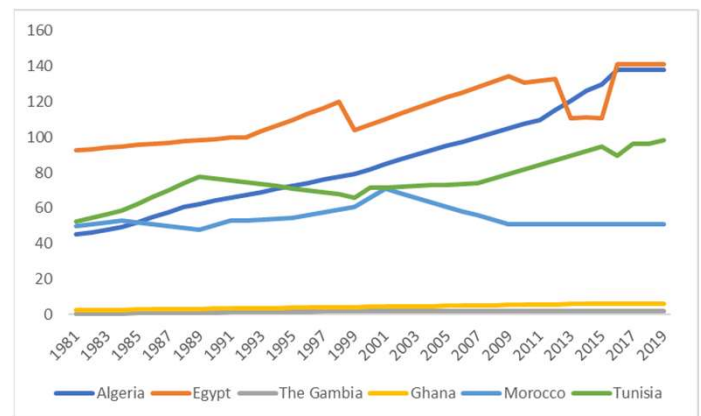


Fig 2. : Water stress level comparison between African countries

- Egypt and Morocco are the two countries in the continent with more touristic activity and population growth.
- Urbanisation influences the distribution of water resources.
- 71% of the changes in the water distribution in Africa is related to the population growth in the countries of the region.

## Conclusions

- Data analytics serve the dual purpose of uncovering the fundamental factors contributing to water stress and offering a viable approach to achieving water management practices [5].
- Evaluating data allows to envision a future in which the management of global water resources is characterized by focusing on the welfare of future generations.
- Machine Learning proves to be a good method to analyze and prevent catastrophes related to water extraction. This research could be extended applying a wider range of machine learning models and combinatorial functions.