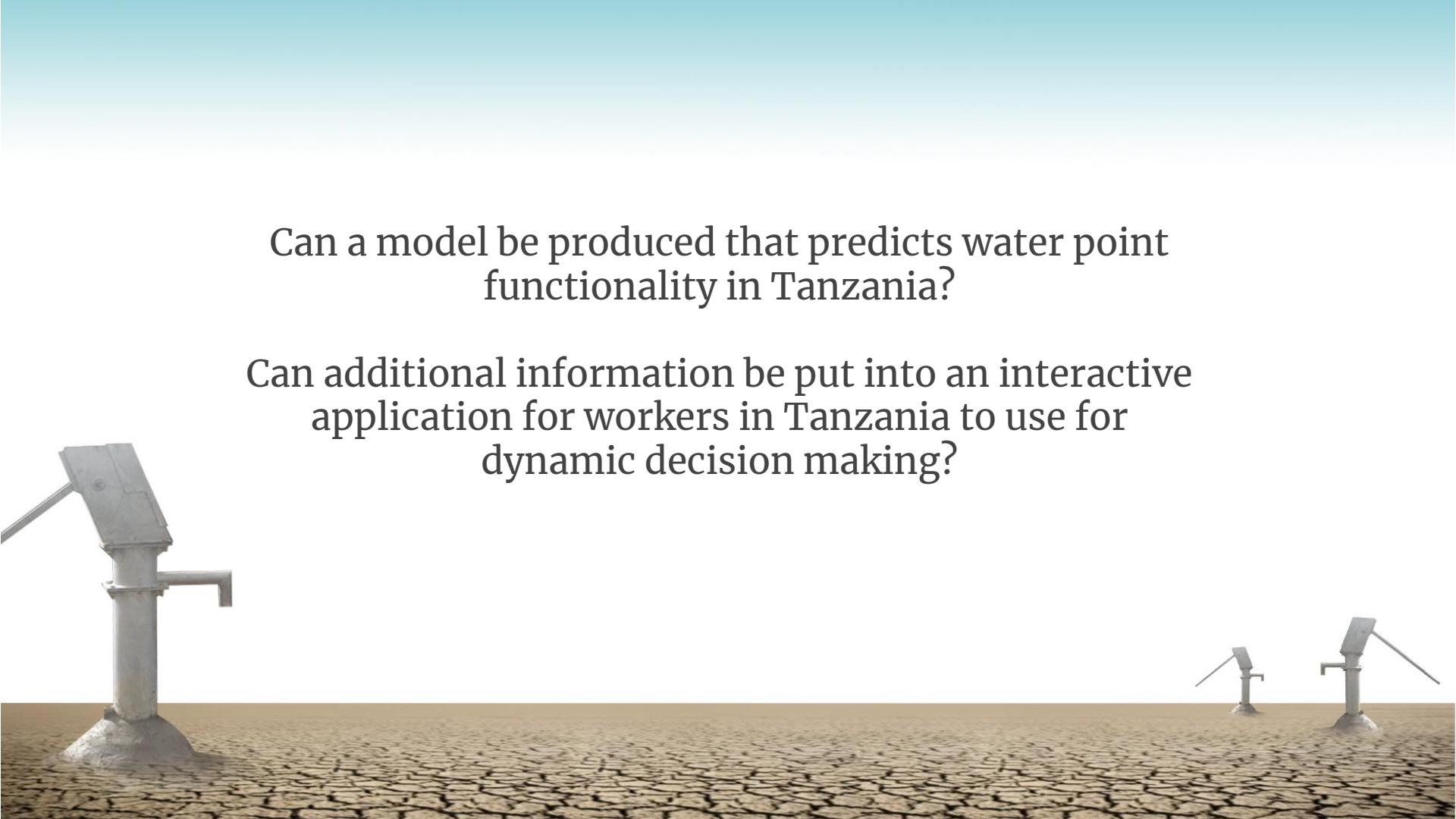




# Water Improvement In Tanzania



Jackie Petersen, Kaleb Tsegaye,  
Cody Can, and Sb Fuller

The background of the slide features a vast, cracked, light-brown landscape representing dry ground. Three white, manual hand pumps are scattered across the scene. One pump is prominently visible on the left side, another smaller one is in the lower right, and a third is further back on the right. The sky above is a clear, pale blue.

Can a model be produced that predicts water point functionality in Tanzania?

Can additional information be put into an interactive application for workers in Tanzania to use for dynamic decision making?



In Tanzania, clean drinking water is accessible for only 55% of the population and improved sanitation is available for only 15% of the population.



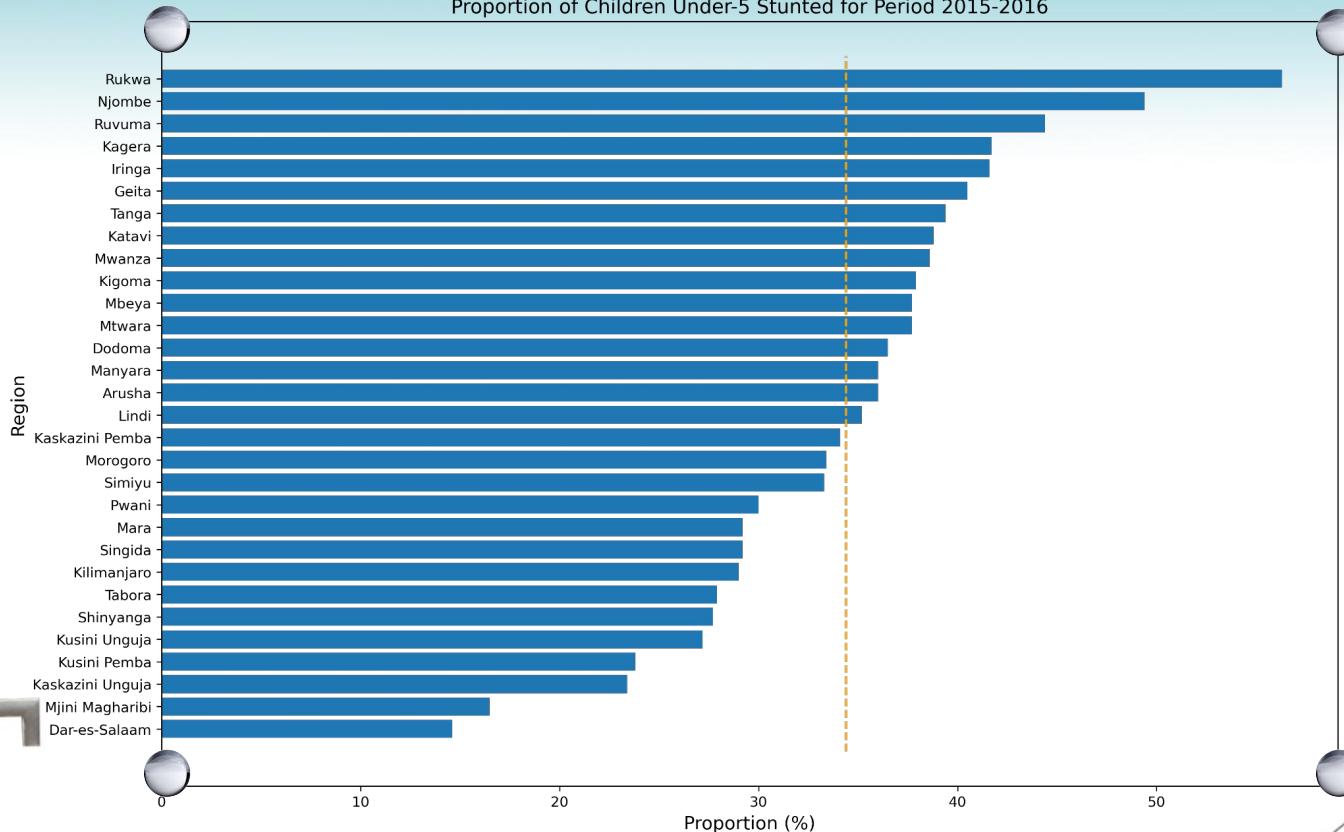


The median age of the Tanzanian population is only 17.7 years of age, with a life expectancy of 62.6 years of age.

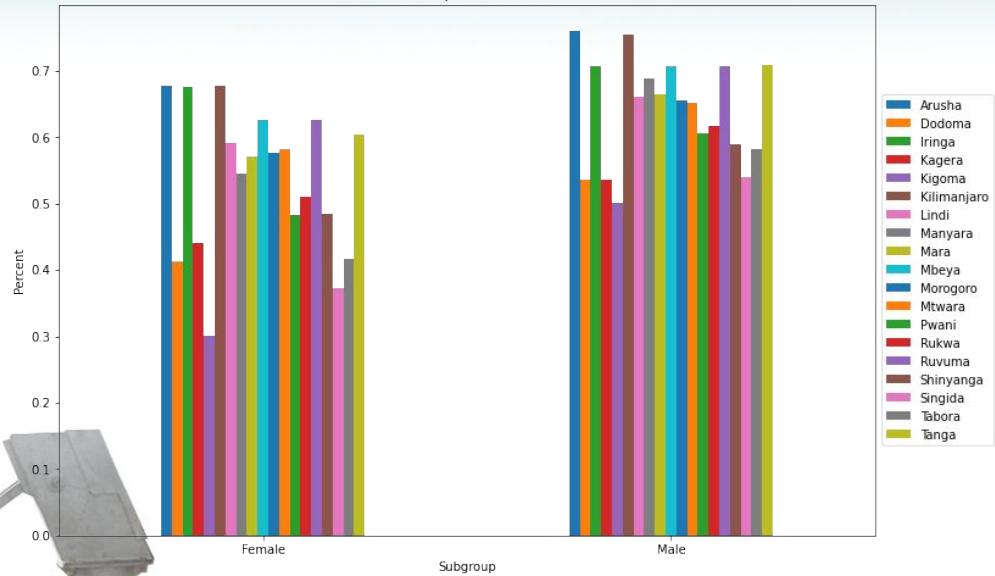
Improved sanitation and access to water could vastly improve the life expectancies of Tanzanians.



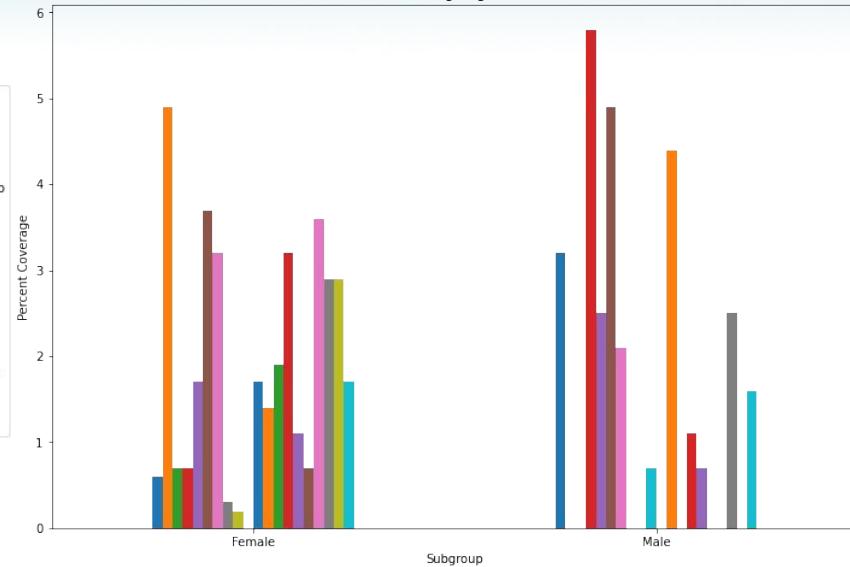
Proportion of Children Under-5 Stunted for Period 2015-2016



Human development index in 2012

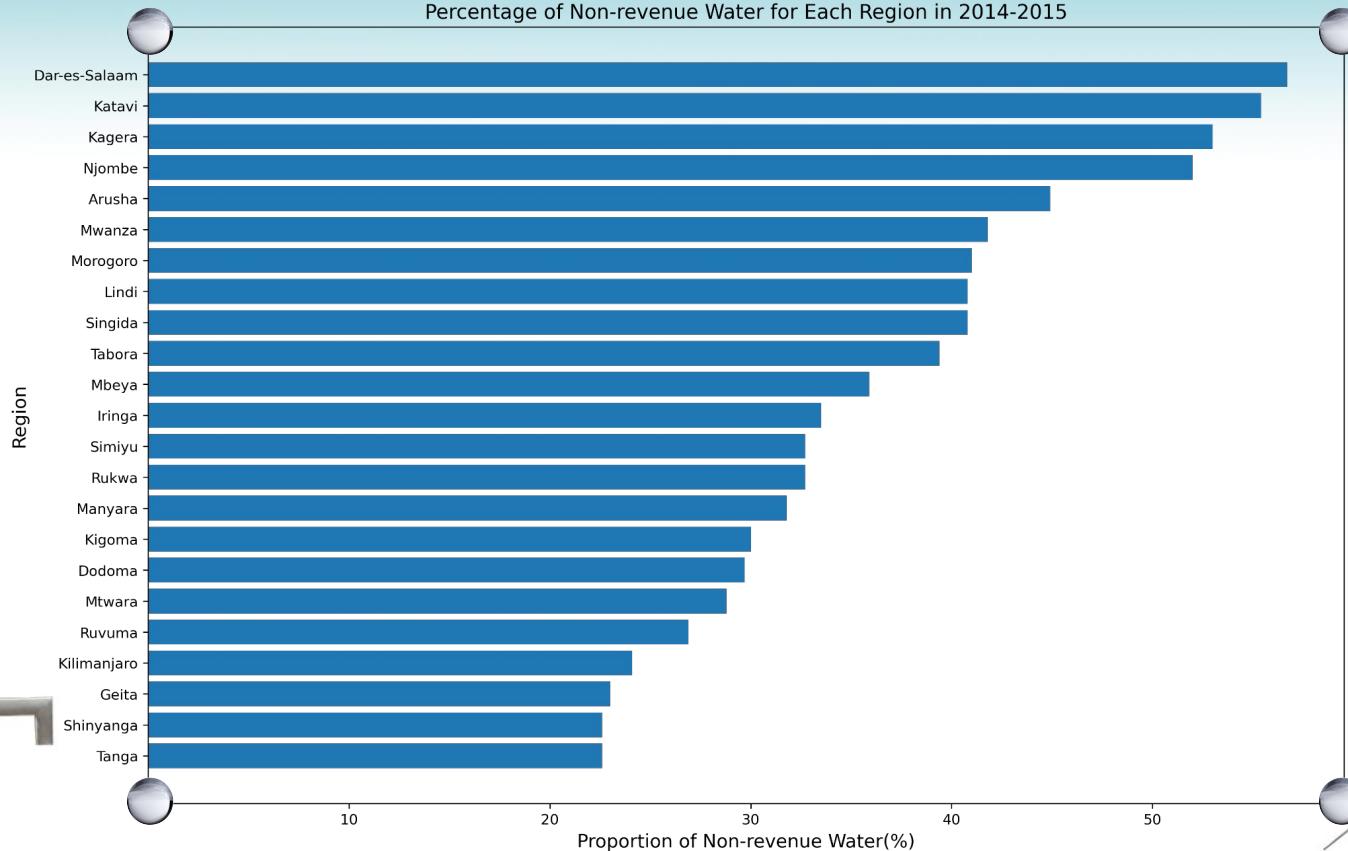


Health insurance coverage age 15-49 in 2015-2016



- Region by region, human development indices and health insurance rates dramatically differ between the sexes.

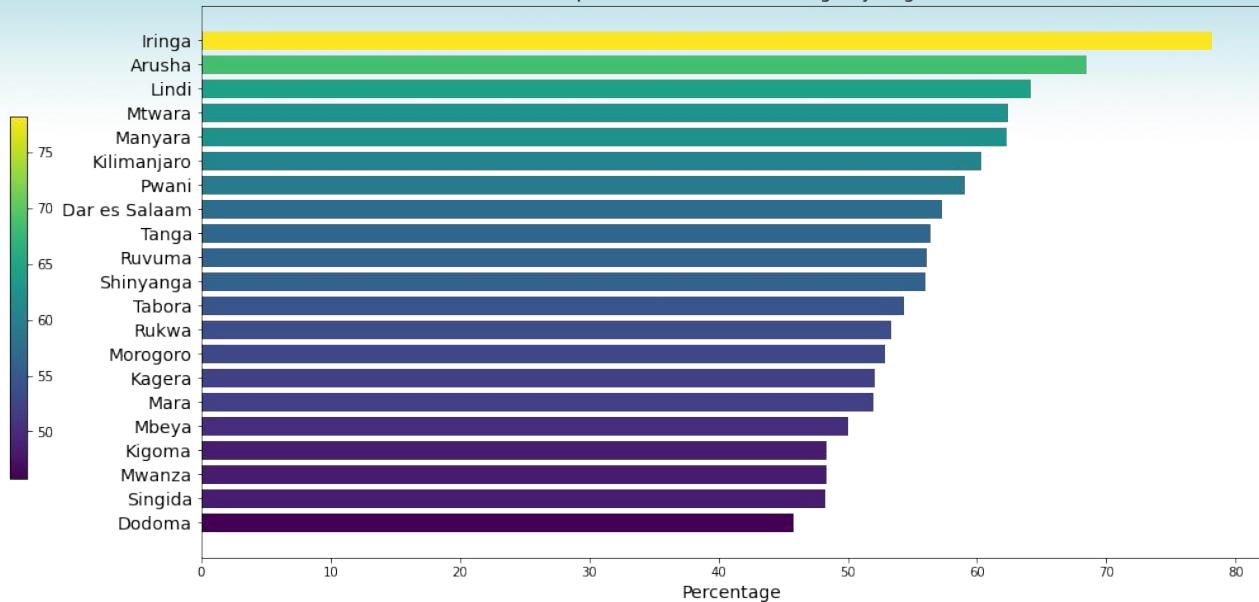
Percentage of Non-revenue Water for Each Region in 2014-2015



Functional Waterpoint Percentage by Region

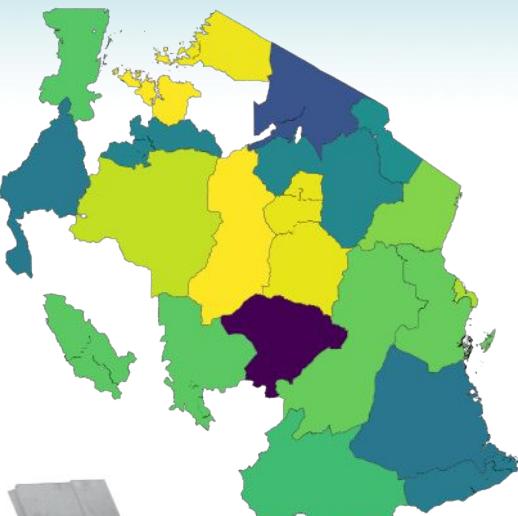


Waterpoint Functional Percentage by Region

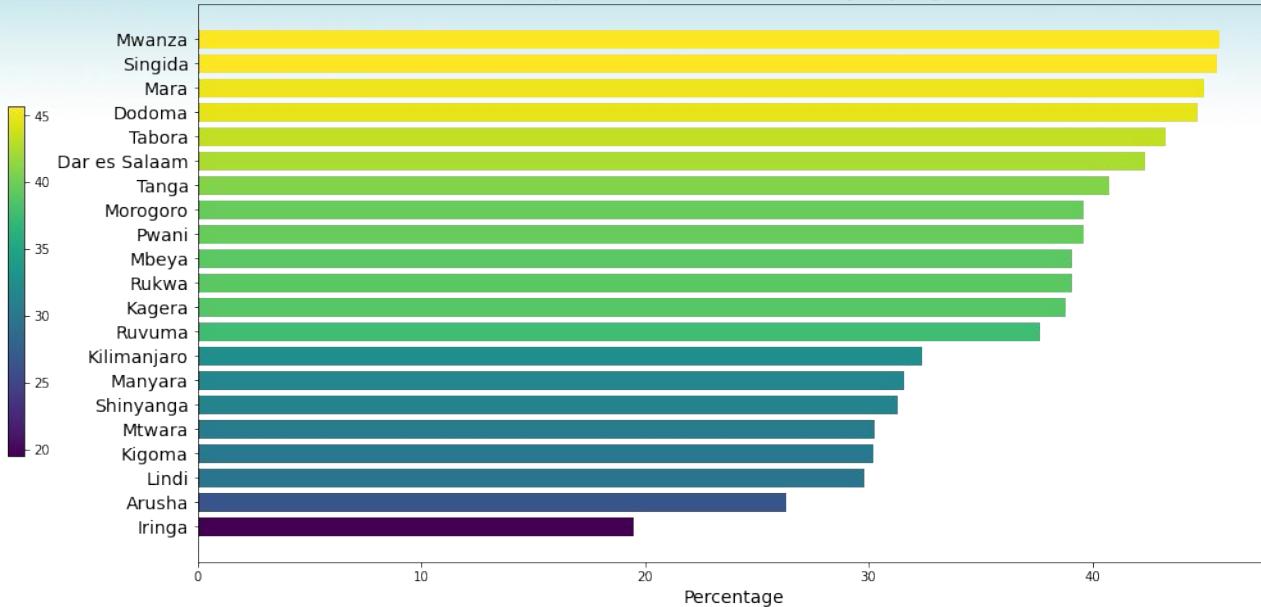


- ➊ Iringa has the highest percentage of functional wells.
- ➋ Dodoma has the lowest percentage of functional wells.

Non-Functional Waterpoint Percentage by Region



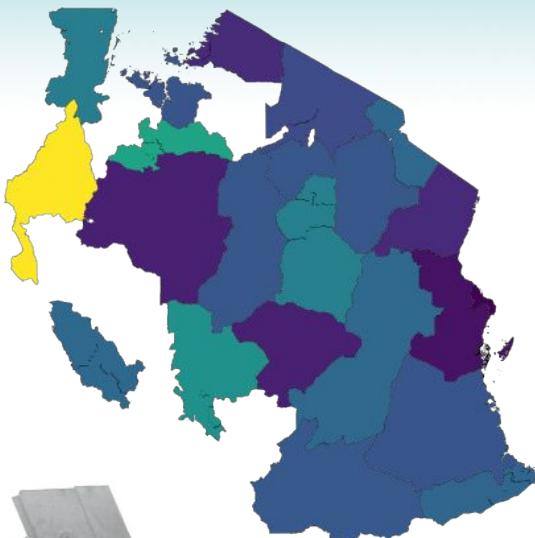
Waterpoint Non-Functional Percentage by Region



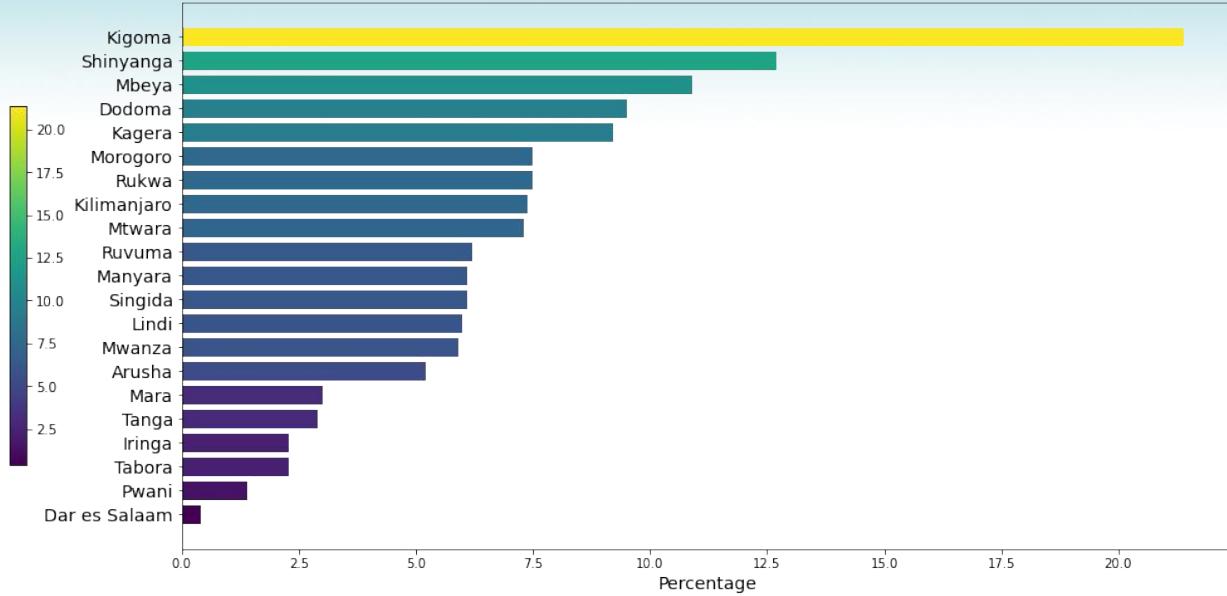
- ➊ Mwanza has the highest percentage of non-functional wells.
- ➋ Iringa has the lowest percentage of non-functional wells.



Percentage of Waterpoints Needing Repair by Region



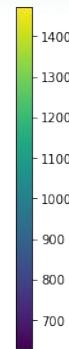
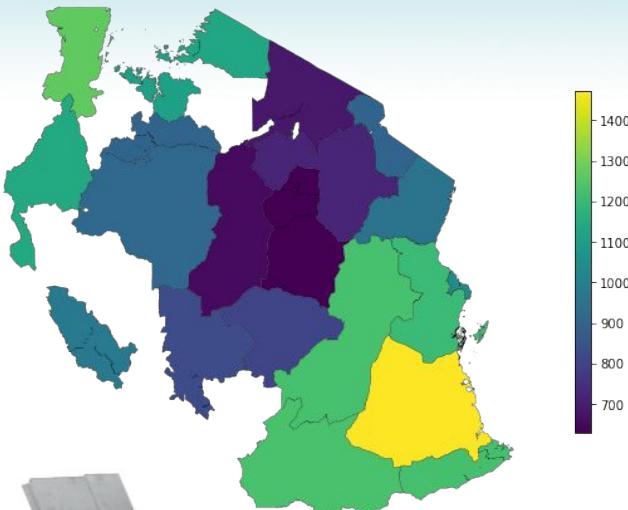
Waterpoint Needing Repair Percentage by Region



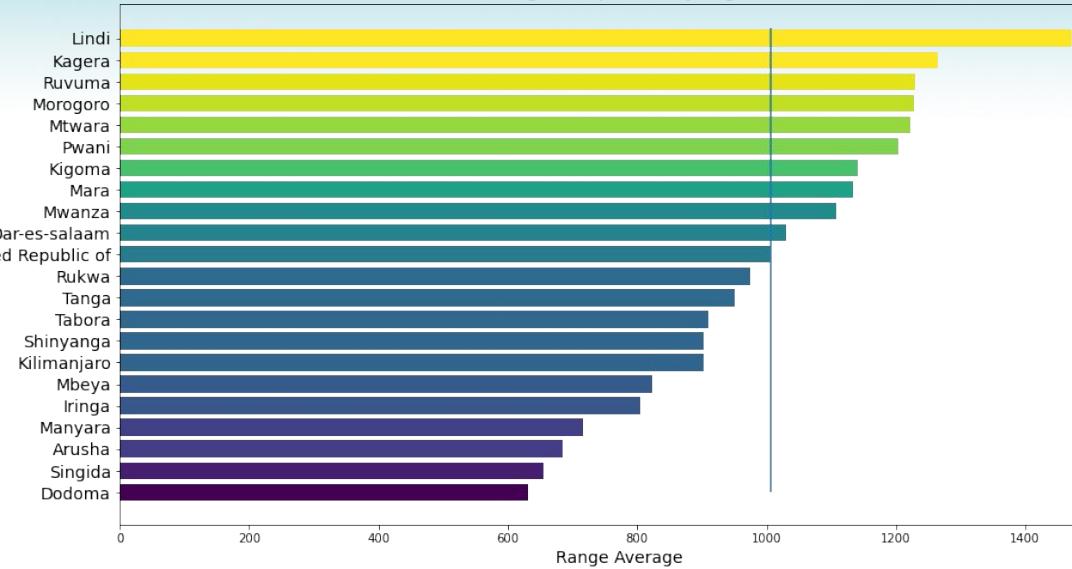
- ➊ Kigoma has the highest percentage of functional wells in need of repair.
- ➋ Dar es Salaam has the lowest percentage of functional wells in need of repair.



Average Precipitation by Region from 2000-2020

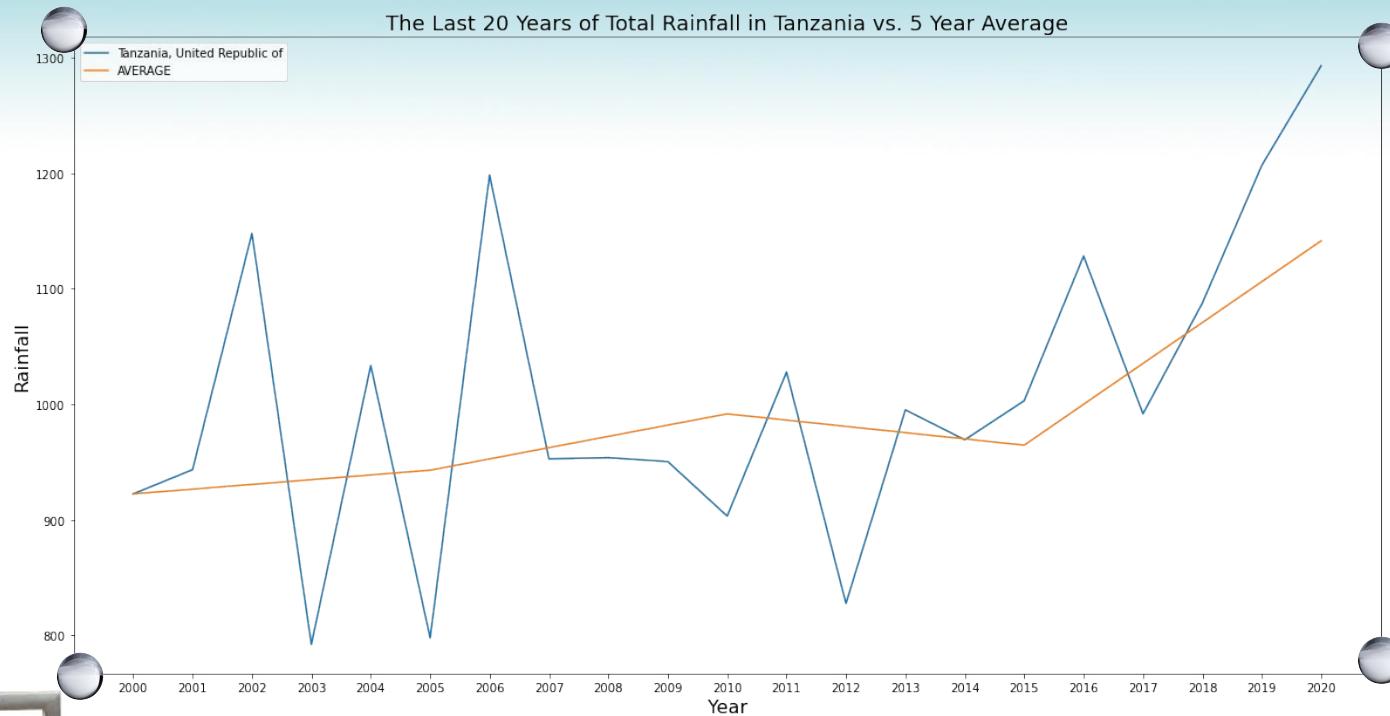


Average Precipitation by Region



- Lindi had the highest average precipitation from 2000 to 2020.
- Dodoma had the lowest average precipitation from 2000 to 2020.

## The Last 20 Years of Total Rainfall in Tanzania vs. 5 Year Average



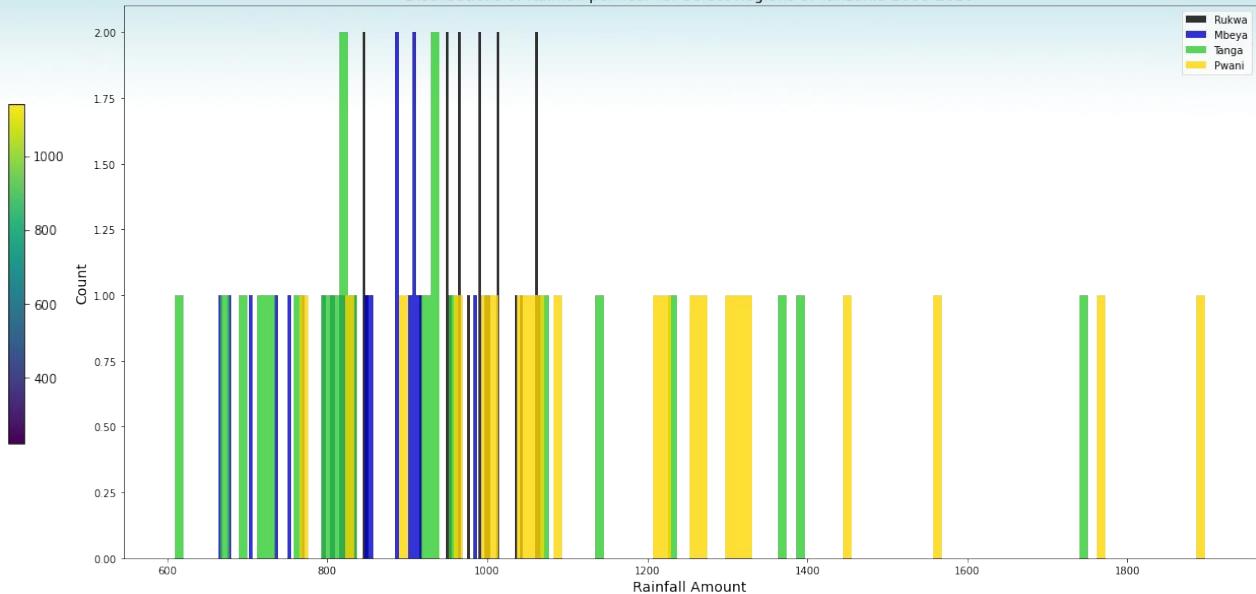
The Last 20 Years of Rainfall in Tanzania by Region



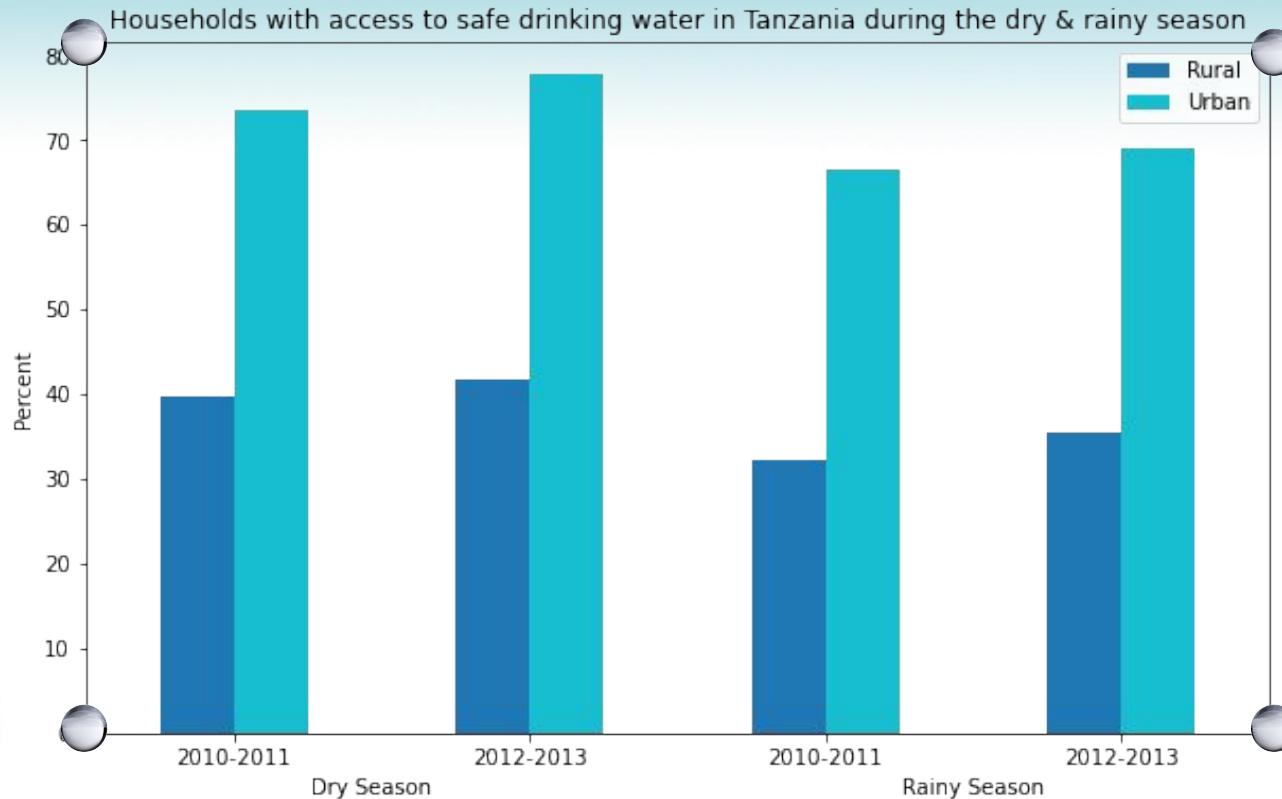
Precipitation Range by Region from 2000-2020



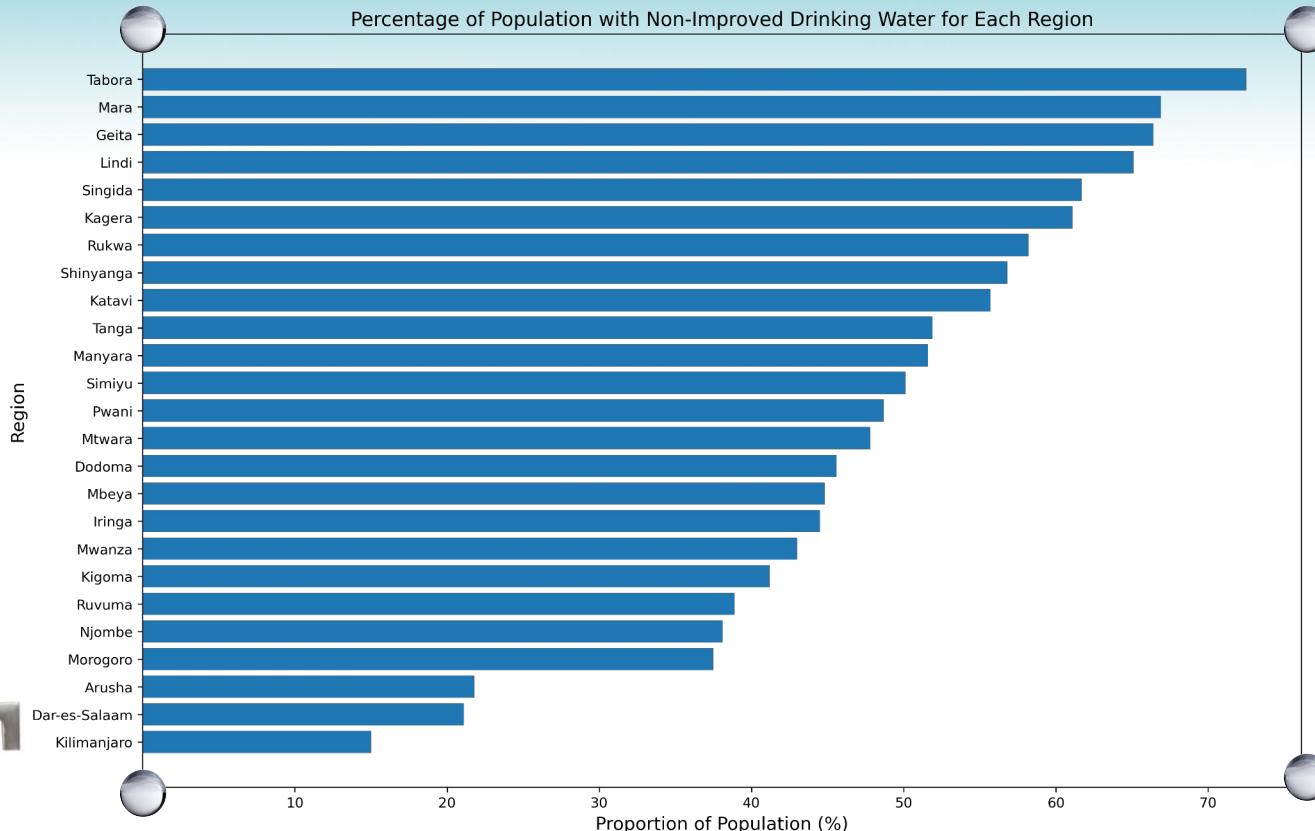
Distributions of Rainfall per Year for Select Regions of Tanzania 2000-2020



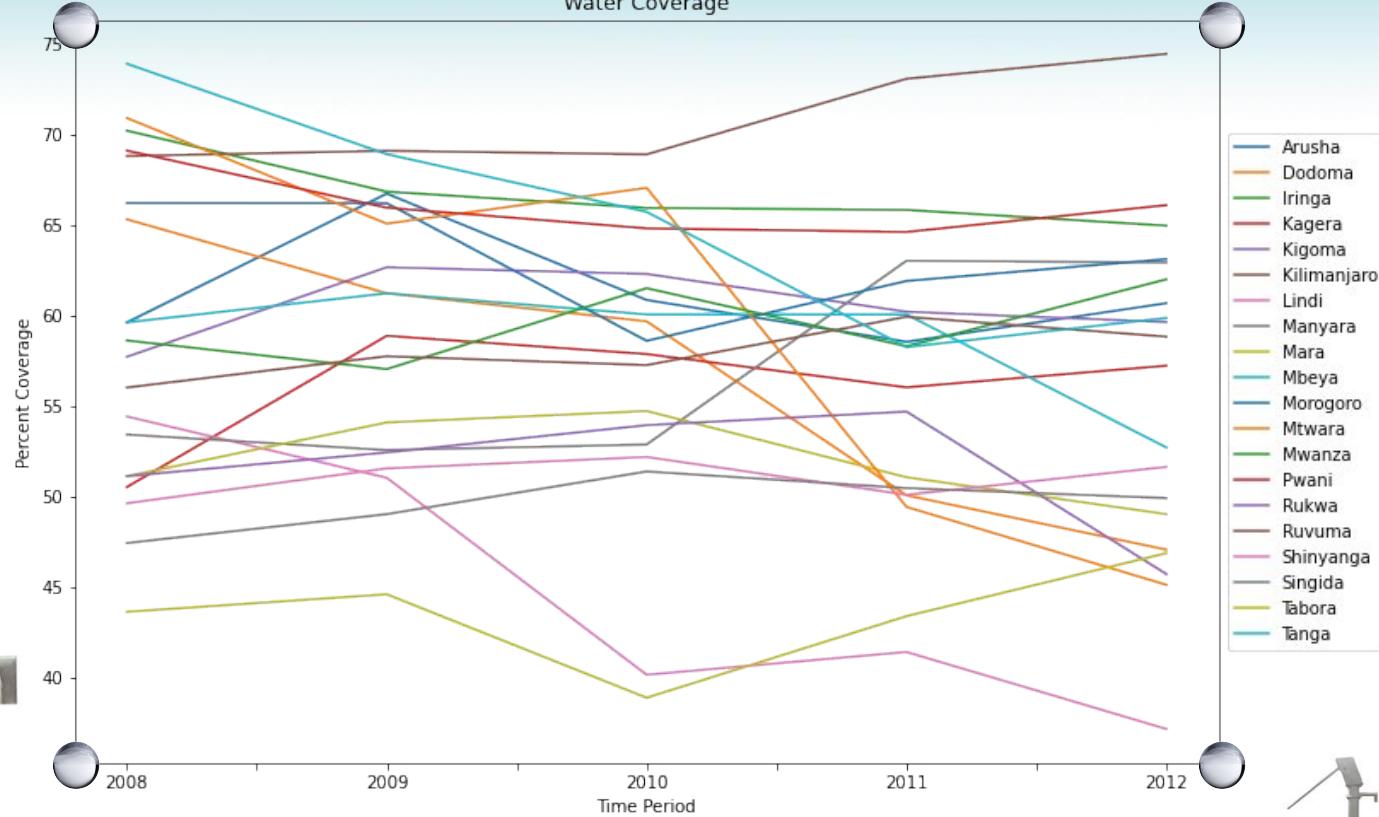
- For the past 20 years...
- Regions like Rukwa and Mbeya have had smaller range of precipitation.
- Tanga and Pwani have had the greatest range of precipitation.

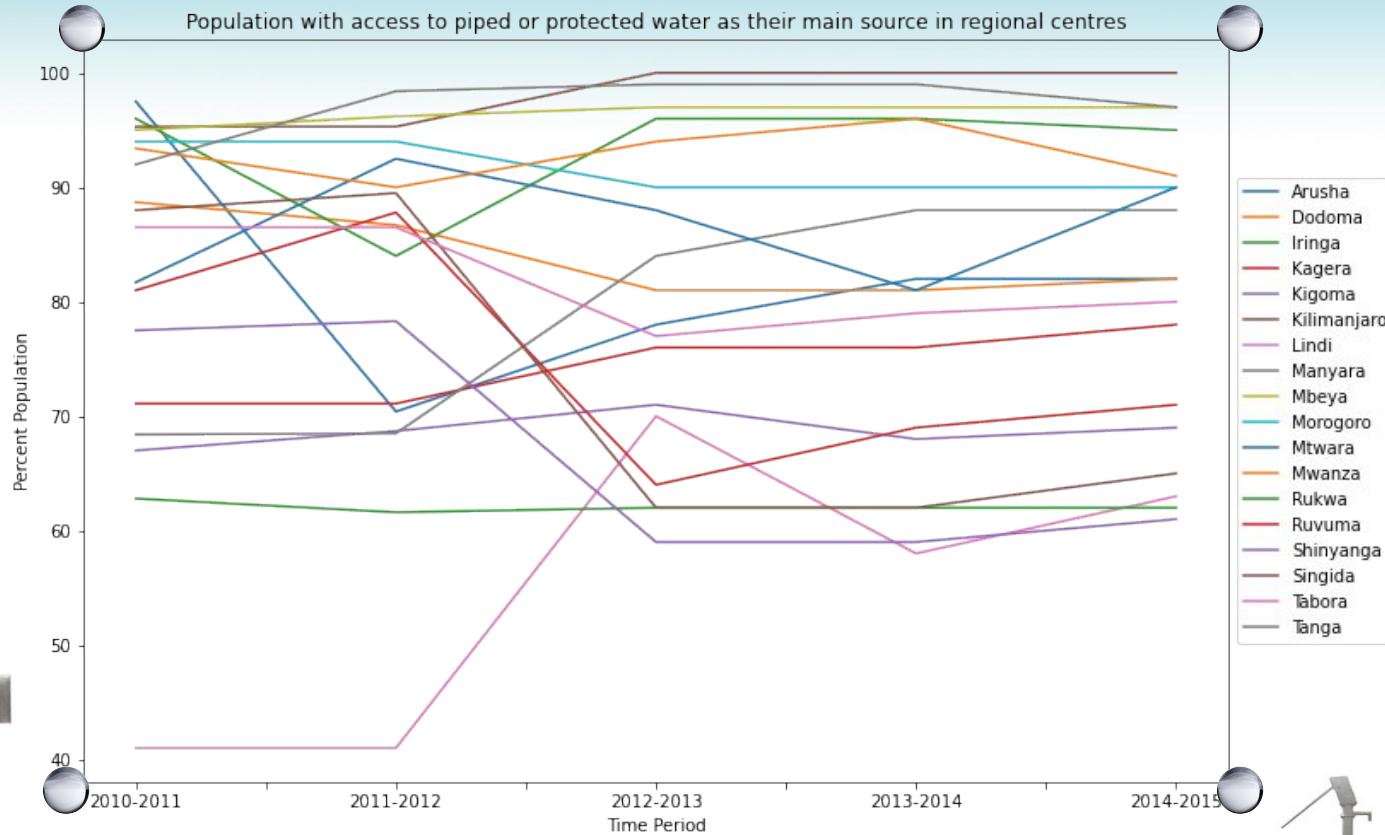
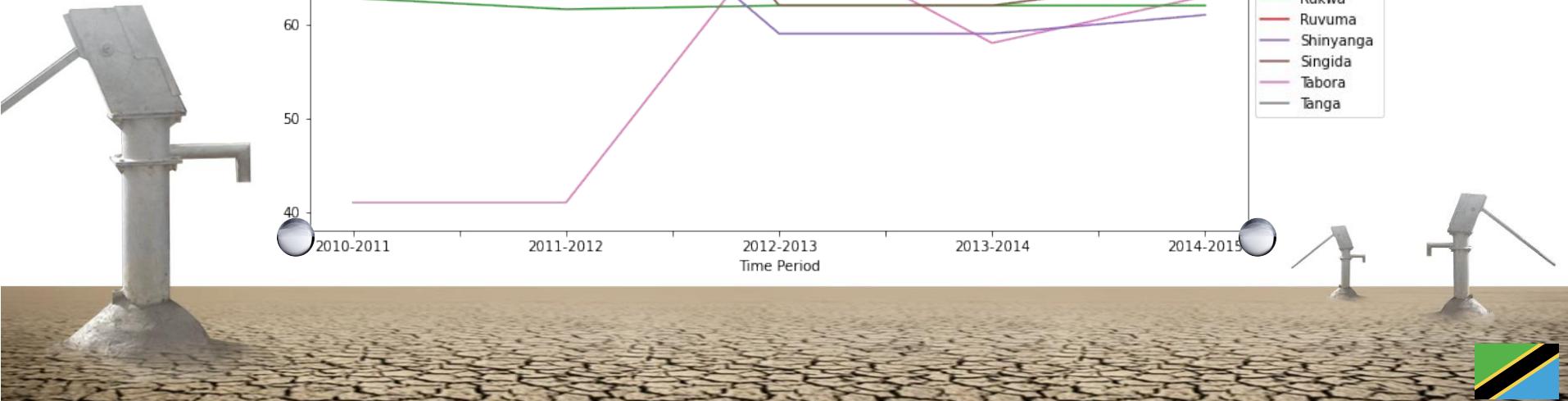


Percentage of Population with Non-Improved Drinking Water for Each Region

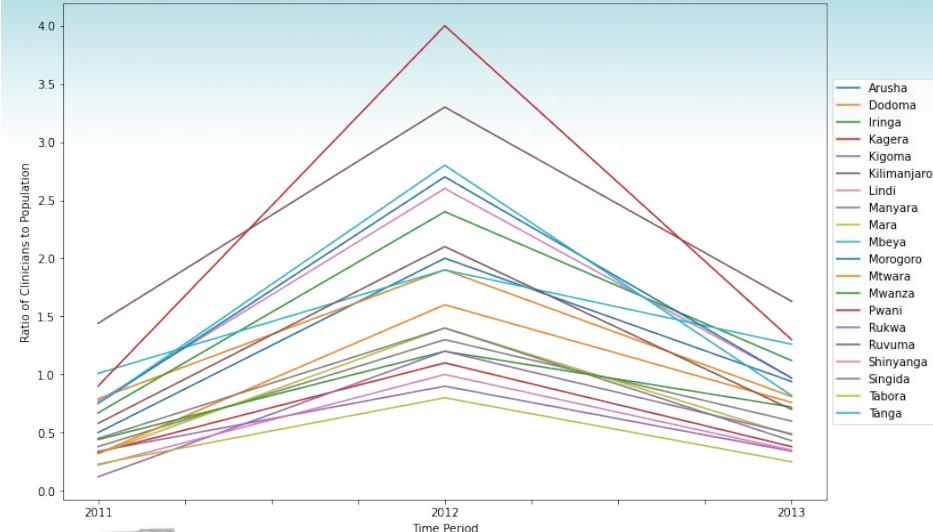


### Water Coverage

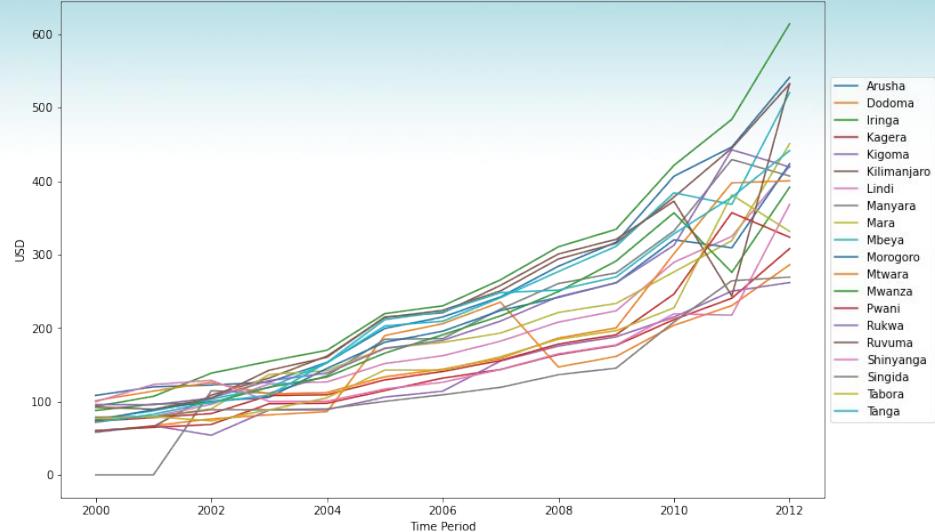




Health worker density per 10,000 population- (Clinicians=MO,AMO and CO)



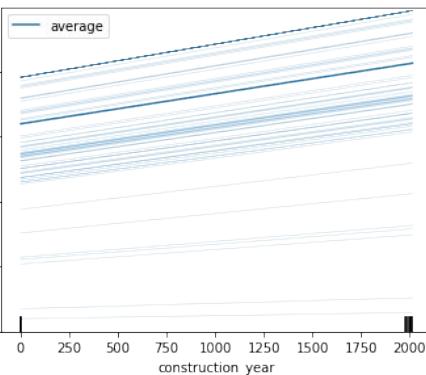
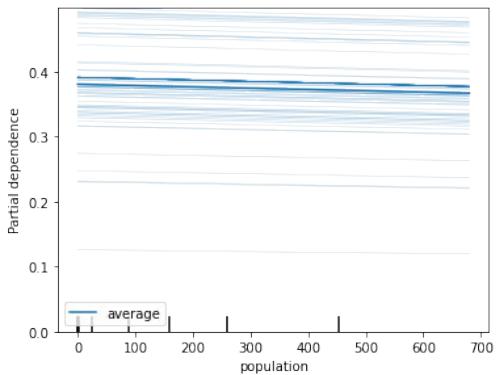
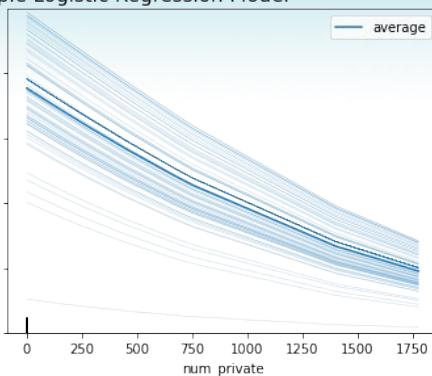
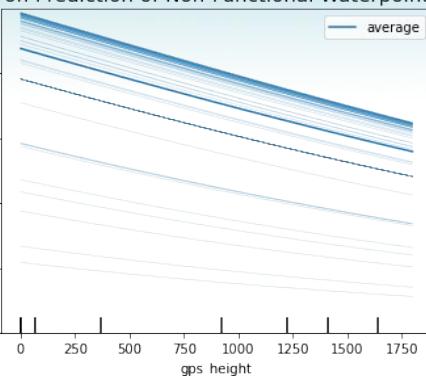
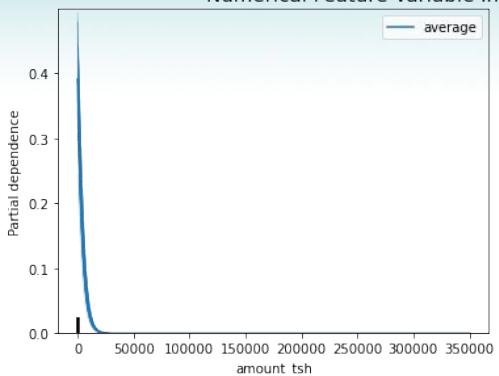
GDP per capita (at current prices)



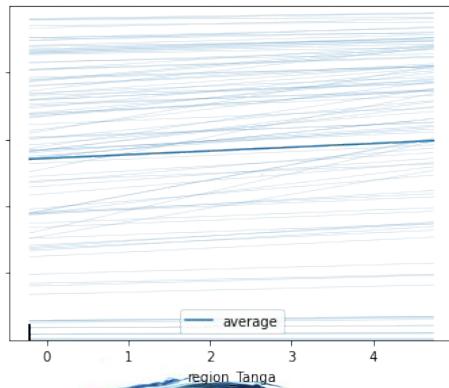
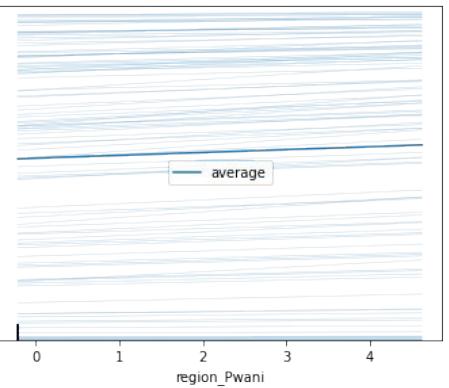
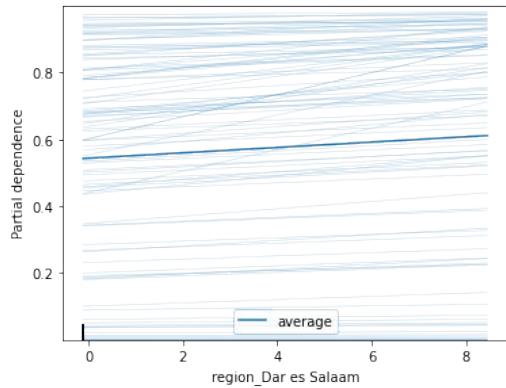
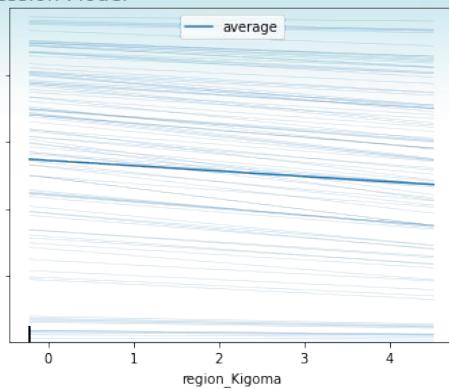
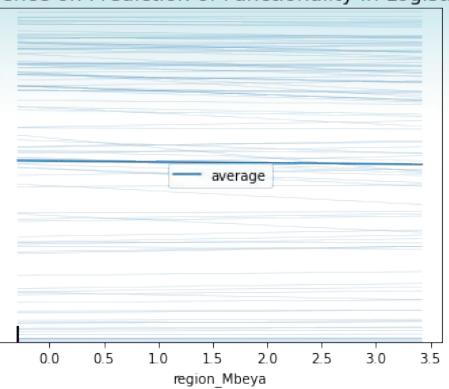
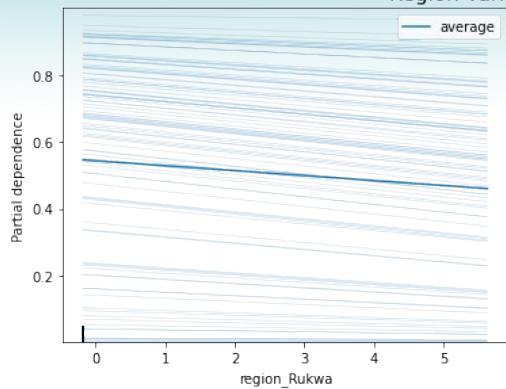
- Region boundary lines can change from year to year with policy changes.
- Different definition can change from year to year with policy changes.  
(e.g. What is a doctor?)
- These changes skew data and create incongruity.



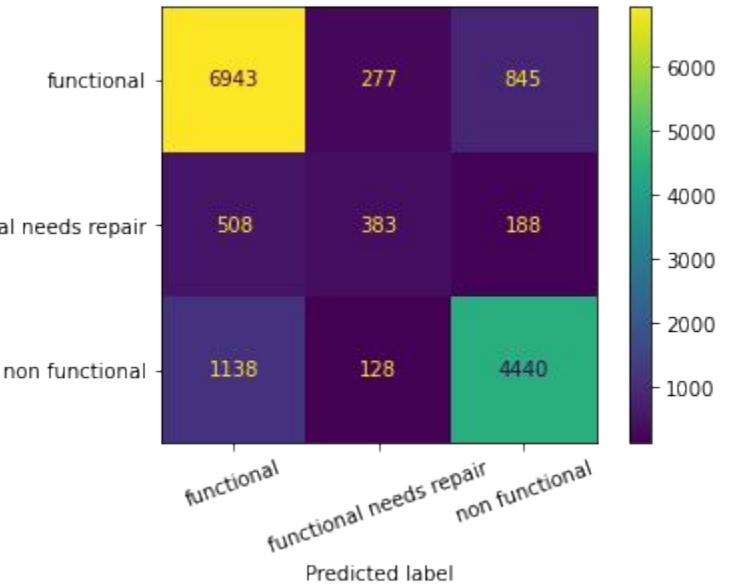
Numerical Feature Variable Influence on Prediction of Non-Functional Waterpoints in Simple Logistic Regression Model



Region Variable Influence on Prediction of Functionality in Logistic Regression Model



# The BEST PERFORMING MODEL has fair performance:



79% of all observations are correctly predicted.

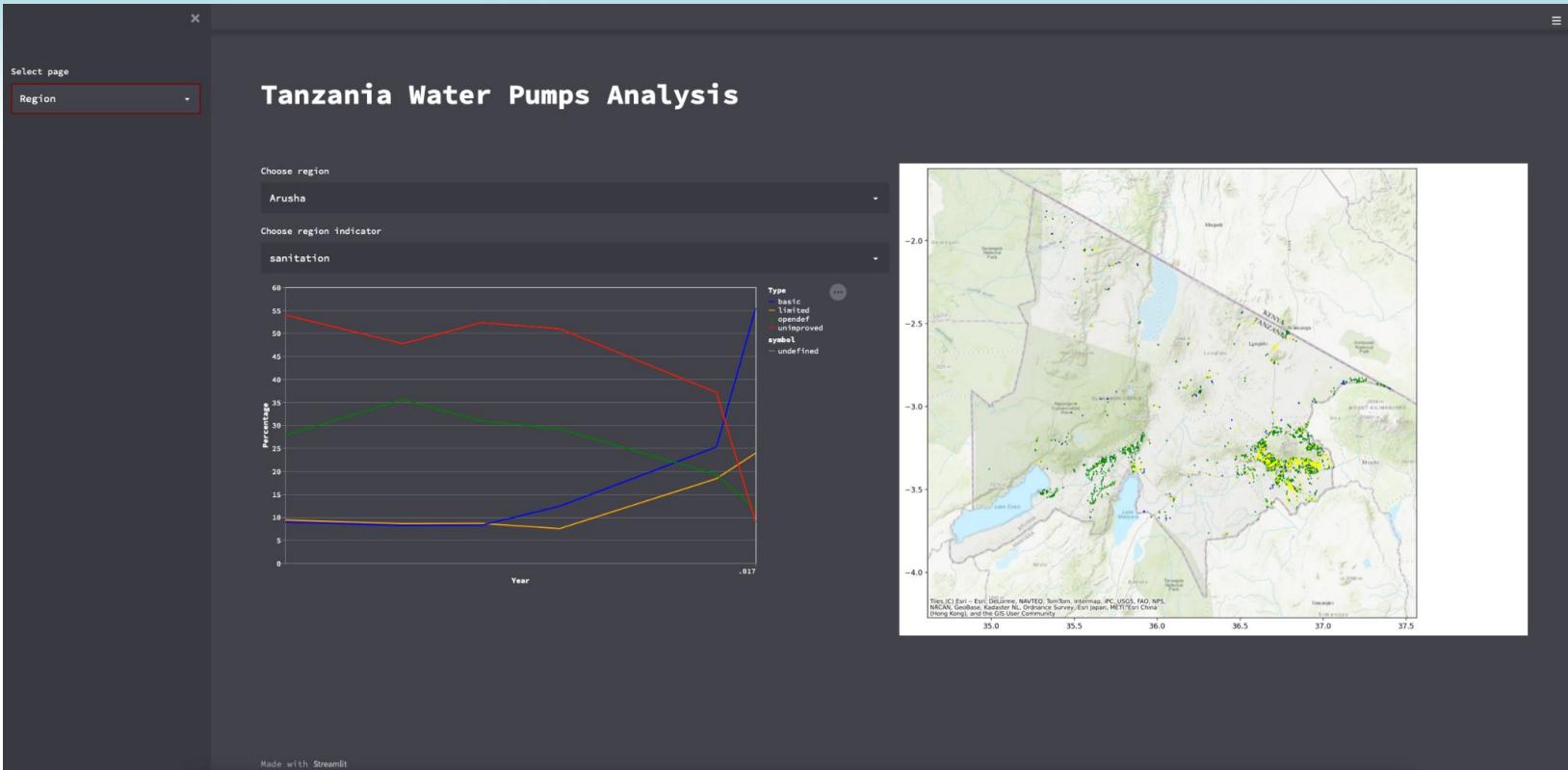
Among predicted positives, 78.6% were correctly predicted.

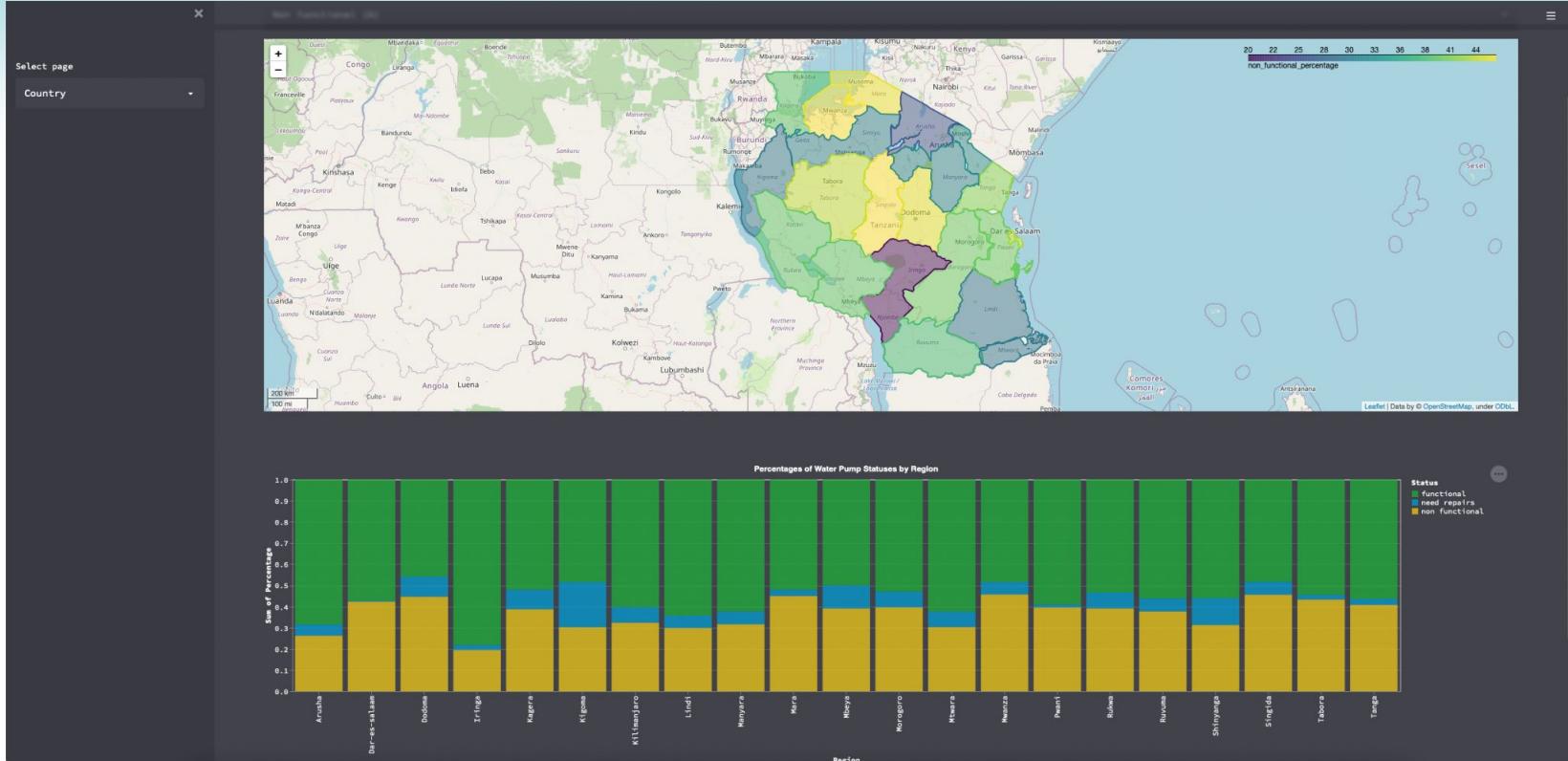
Among actual positives, 79.2% were correctly predicted.

## **RECOMMENDATIONS:**

There is no one size fits all approach to the needs of Tanzania.

Since the nature and needs of Tanzania can be so dynamic, predictive modeling and information transparency can be the best tools for saving lives.





## **RESEARCH SOURCES:**

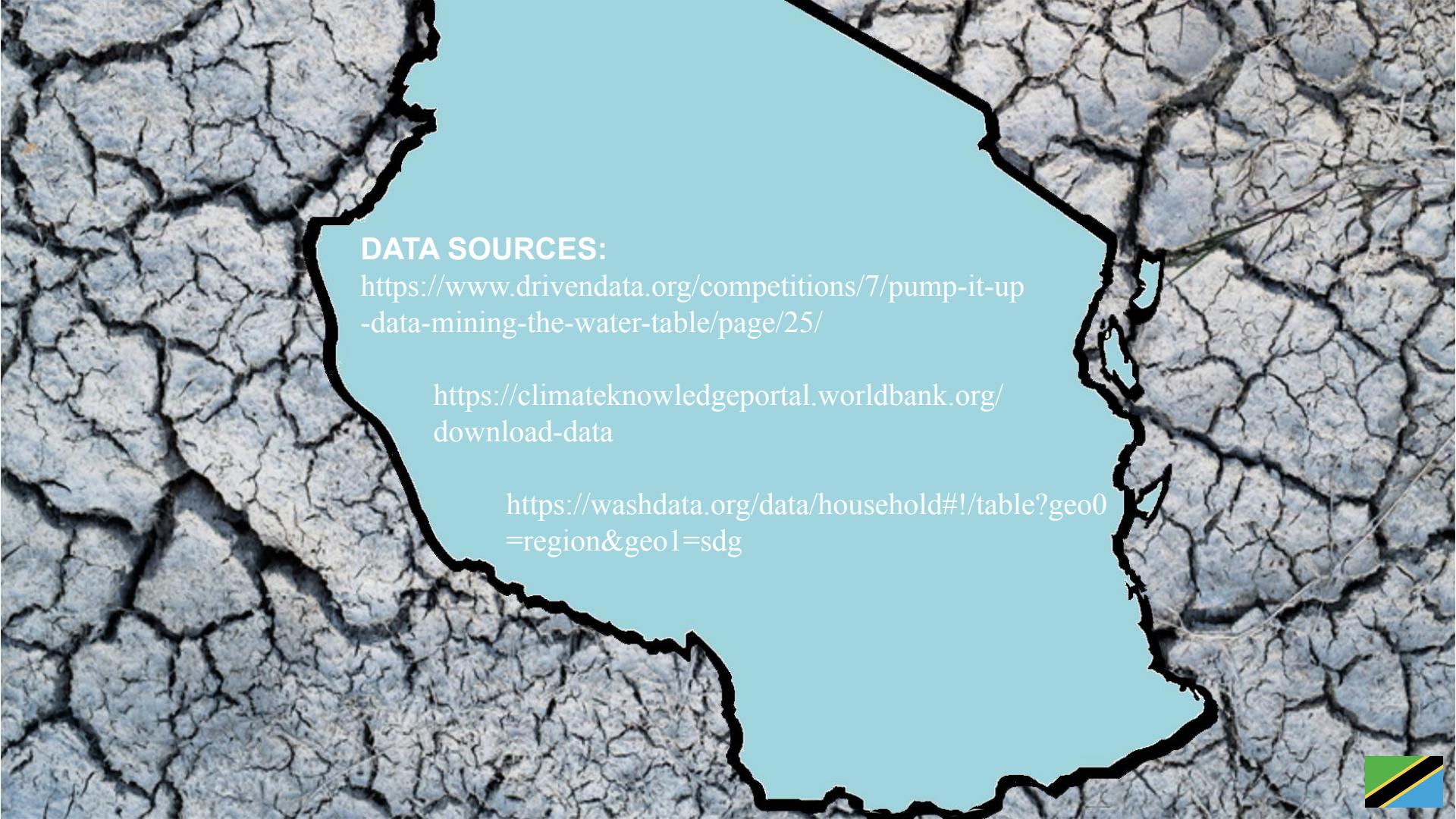
<https://worldpopulationreview.com/countries/tanzania-population>

<https://www.unicef.org/tanzania/what-we-do/wash#:~:text=It%20is%20estimated%20that%20Tanzania,access%20to%20clean%20drinking%20water>

[https://en.wikipedia.org/wiki/Clinical\\_officer#Tanzania](https://en.wikipedia.org/wiki/Clinical_officer#Tanzania)

[https://www.globalhealthdelivery.org/files/ghd/files/ghd-034\\_ttcih\\_final.pdf](https://www.globalhealthdelivery.org/files/ghd/files/ghd-034_ttcih_final.pdf)





## **DATA SOURCES:**

<https://www.drivendata.org/competitions/7/pump-it-up-data-mining-the-water-table/page/25/>

<https://climateknowledgeportal.worldbank.org/download-data>

<https://washdata.org/data/household#!/table?geo0=region&geo1=sdg>





# THANKS!

Now the app demonstration...