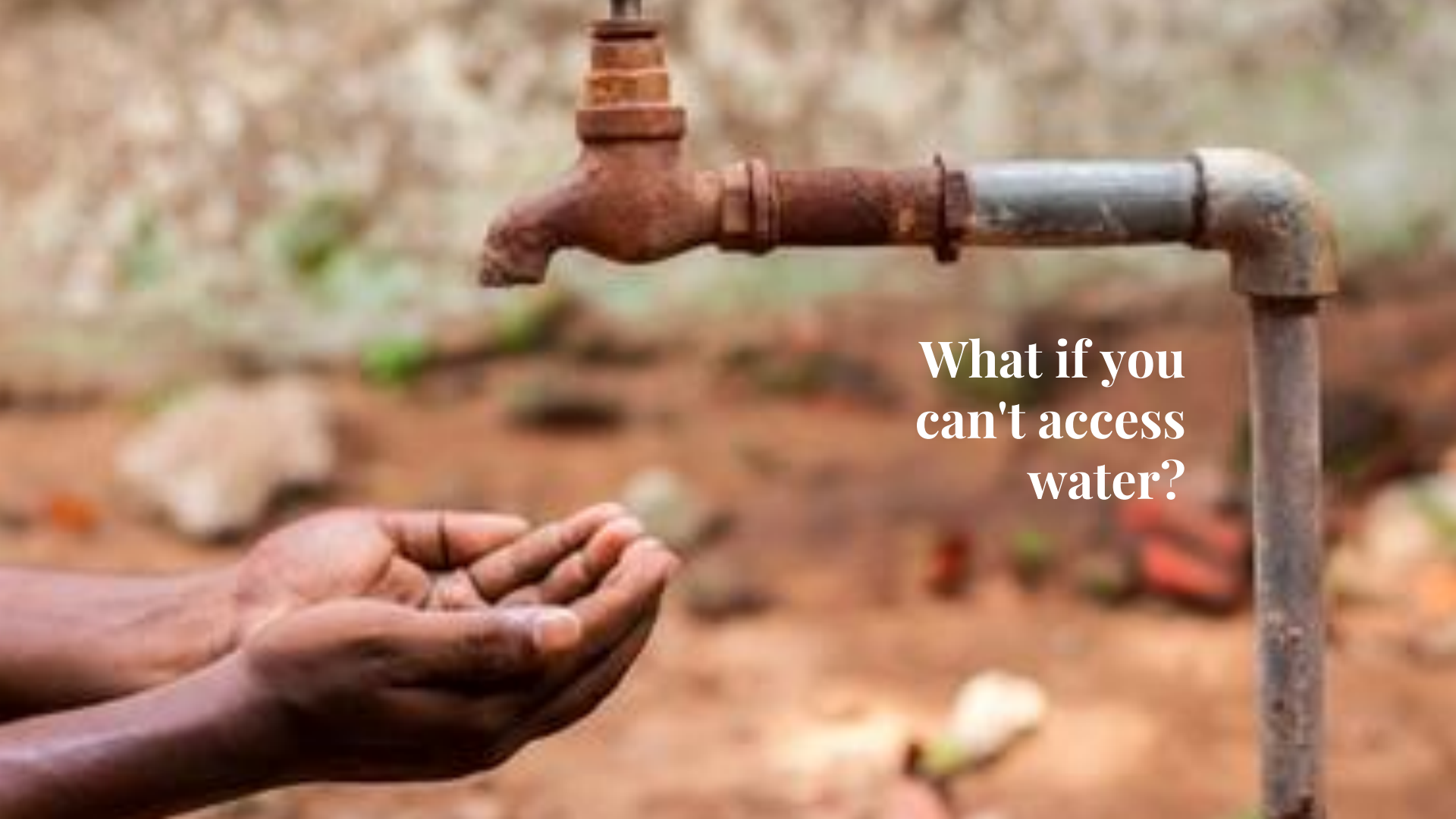




THE WATER PROJECT

PREDICTING WATER PUMP
FUNCTIONALITY IN TANZANIA

A project by Elena Salgueiro

A close-up photograph of a person's hands cupped together, waiting for water to flow from a rusty, outdoor water tap. The tap is mounted on a metal pole and has a weathered, brownish-orange appearance. The background is a blurred, natural setting with dry earth and some greenery. The text "What if you can't access water?" is overlaid on the right side of the image.

**What if you
can't access
water?**

The world water crisis



**#5th global
risk in terms of
impact to
society.**

Water connects every aspect of life



Health



Education

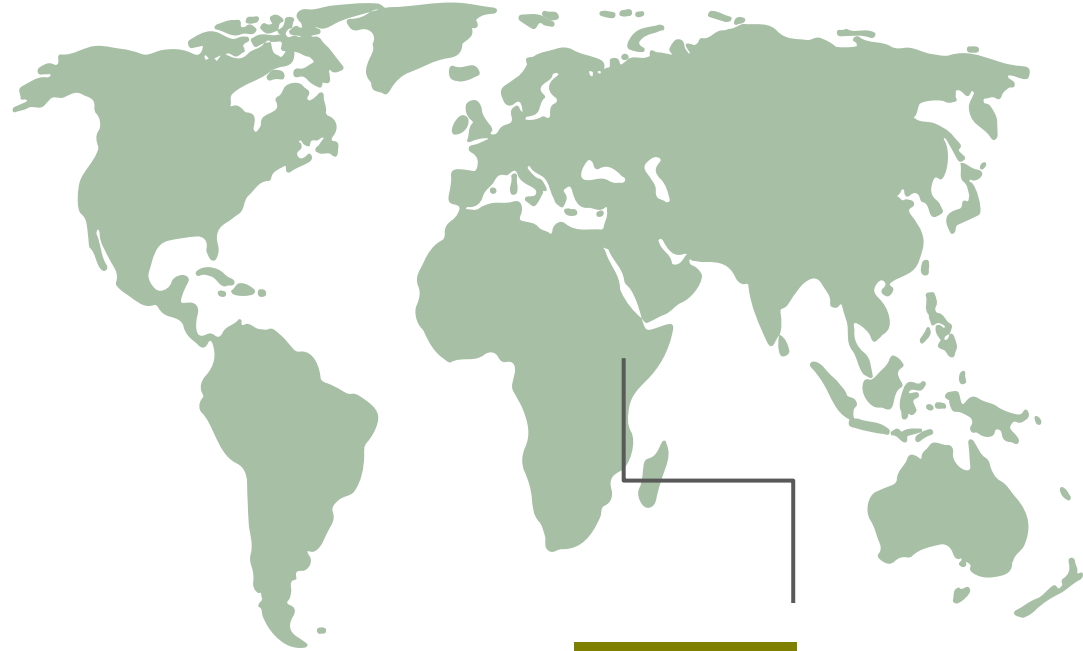


Economic



Equity

785 Million people living
without access to safe water



4 Million in **Tanzania**

Tanzania water point campaign




Hand pumps

Damns



**Comunar
standpipe**

A close-up photograph of a person's hand, wearing a grey long-sleeved shirt, holding a yellow plastic water container. The container has a handle and a threaded opening. In the background, a yellow fishing net is visible, hanging from a blue cloth. The text "How can we help to solve the problem?" is overlaid on the right side of the image.

How can we help
to solve the
problem?

#We need DATA

The **Tanzanian Ministry of Water** have kept detailed data of 59.400 water pumps that have been installed in the country.

40 variables describing the characteristics and situation of each water pump

*The data for this project obtained through Driven Data website.



#The SOLUTION

KEY INSIGHTS

Potential causes for water pumps malfunctioning in order to achieve future improvements

PREDICTION MODEL

Predict the maintenance requirements of the water pumps for guarantee functionality and improve the cost-effectiveness of these maintenance operations

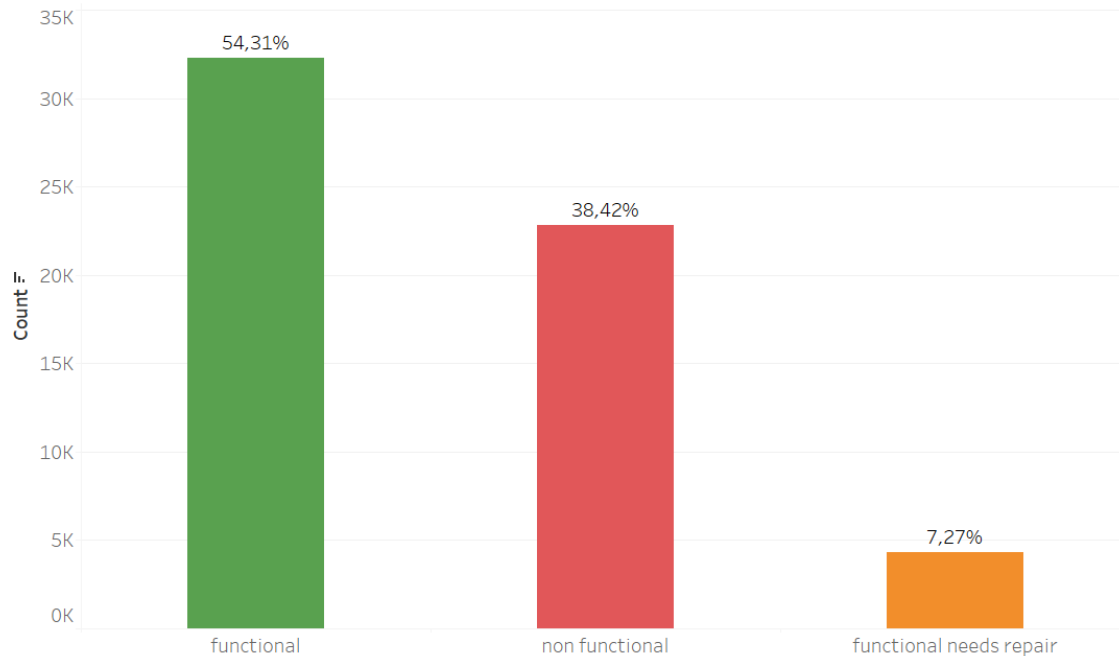


A photograph of a rusty, manual water pump standing in a vast, cracked, and dry landscape under a hazy sky. The pump is made of weathered metal and has a curved handle. The ground is parched and cracked into a mosaic of irregular shapes. The overall tone is somber and evocative of drought.

**What does
the data tell
us?**

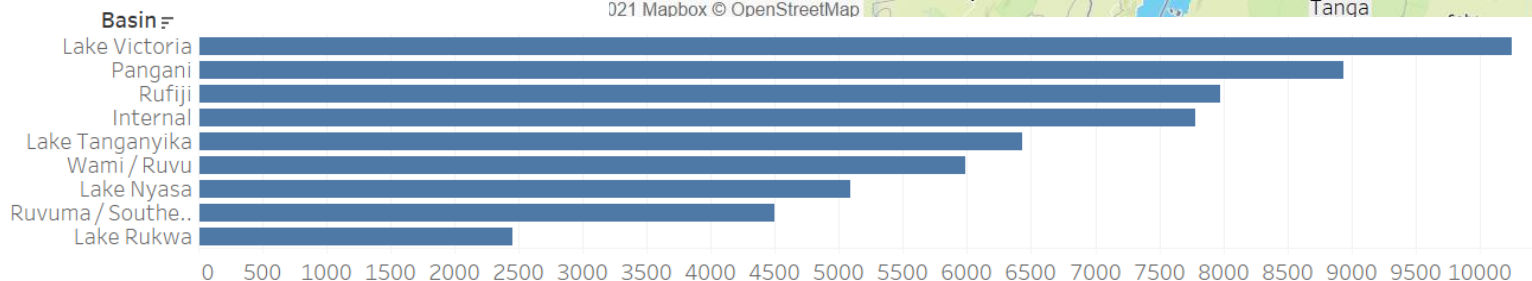
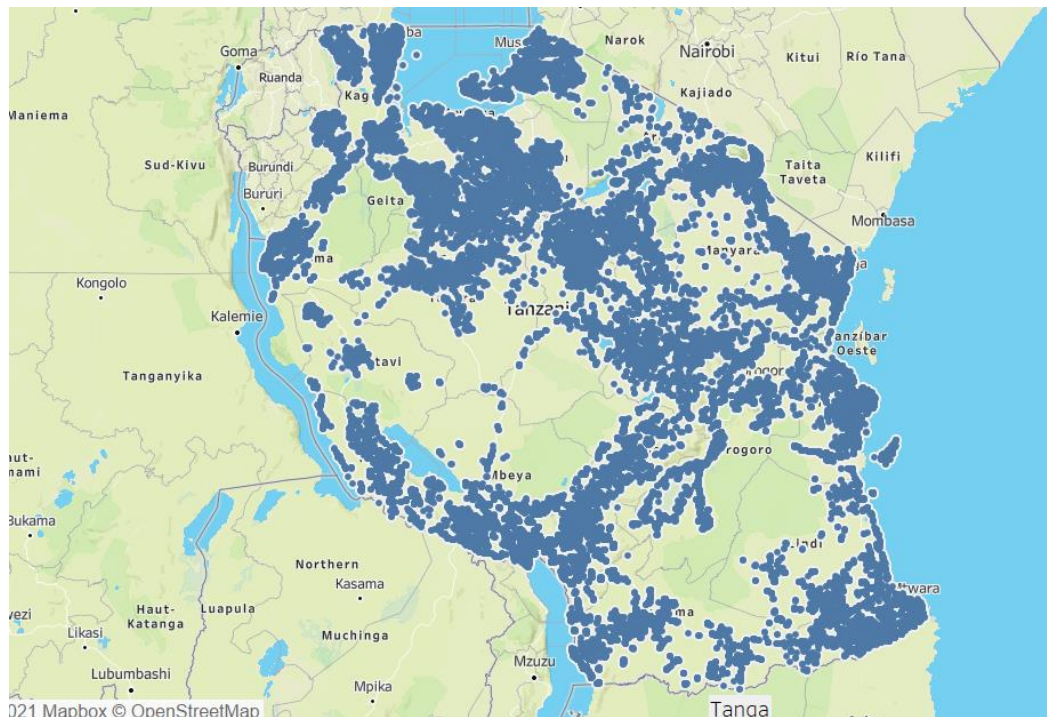
#Water points functionality status

Almost half of the waterpoints installed are not functional or they do not work properly.

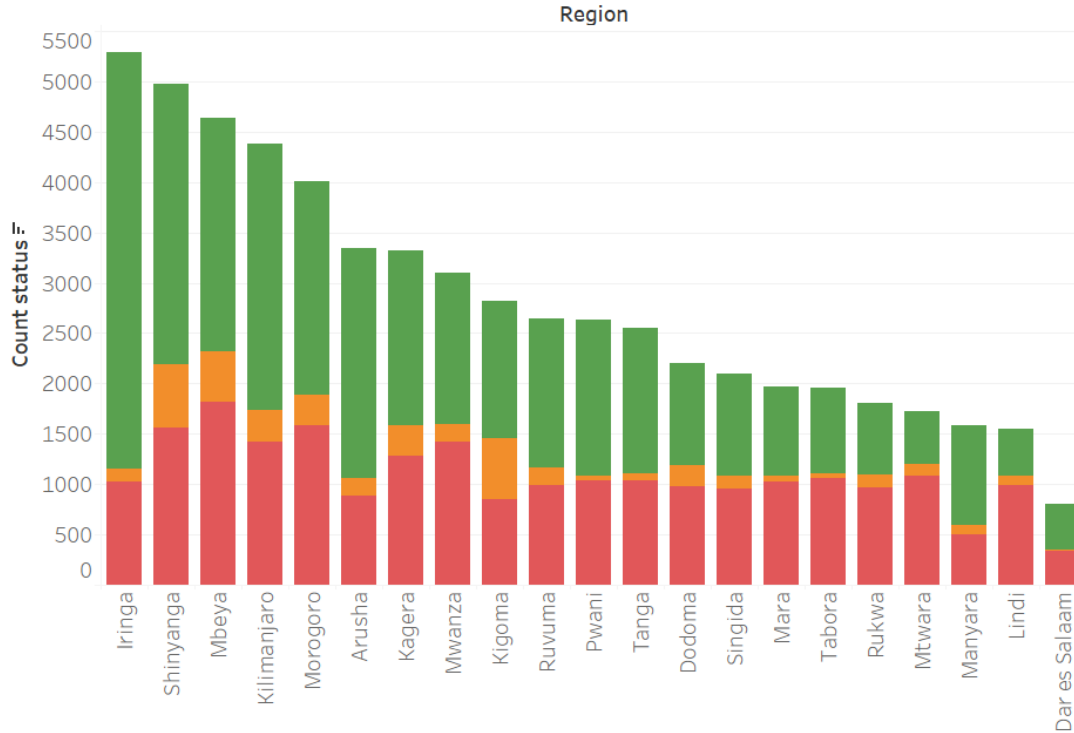


#Geographical distribution

*Water points are situated around
the main lakes and rivers within
Tanzania*



#How does the **region** of a well relate to its functionality?

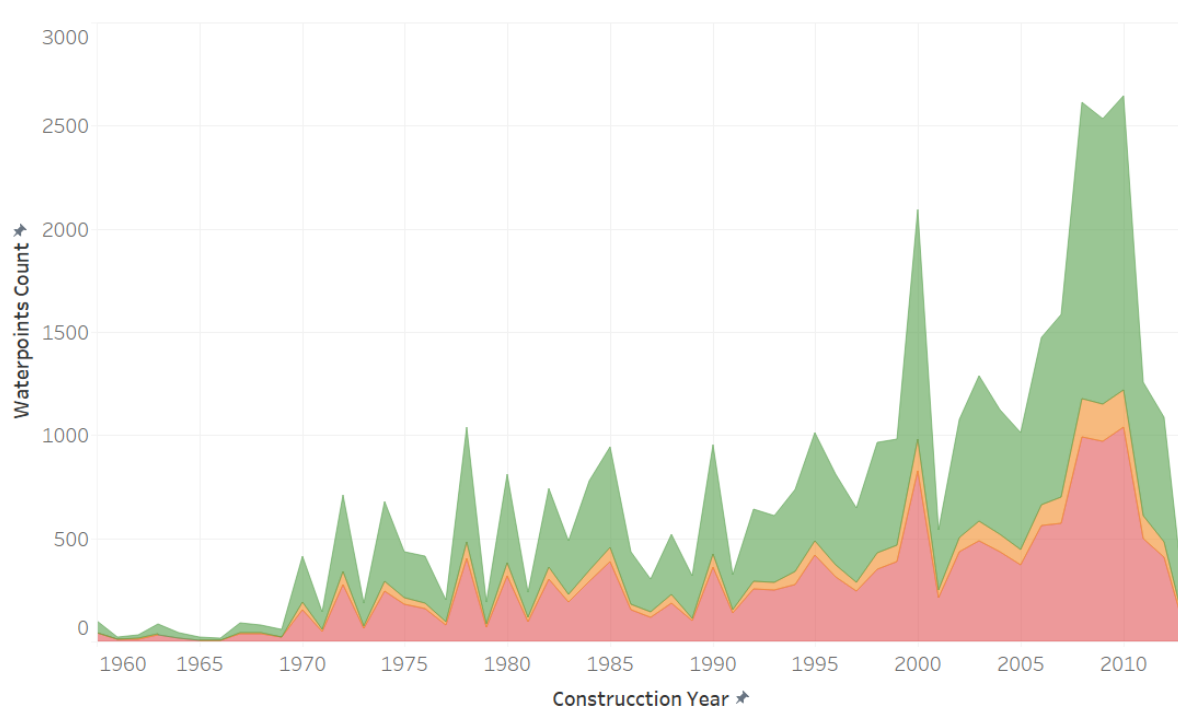


Non functional rate is extremely high in some regions.

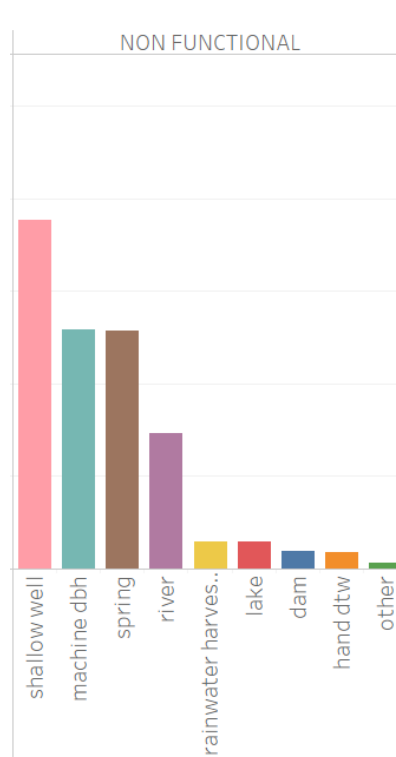
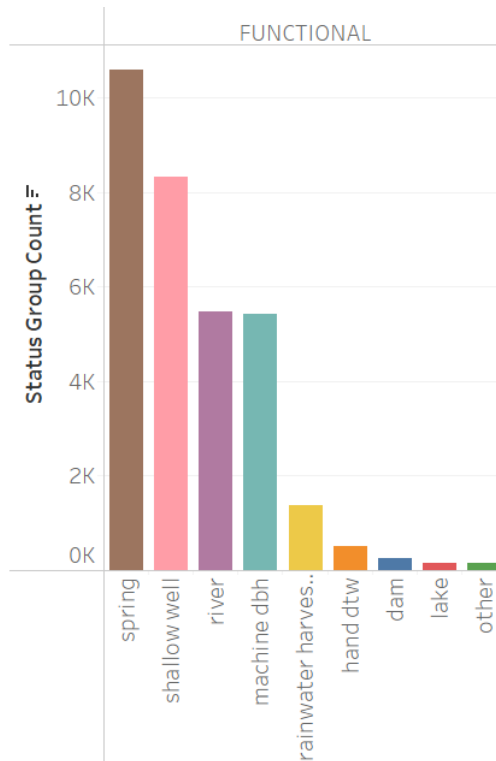
#How does the **age** of a waterpoint relate to its functionality?

The ones that were built recently are as likely to be not functional as older one.

This is very worrying!

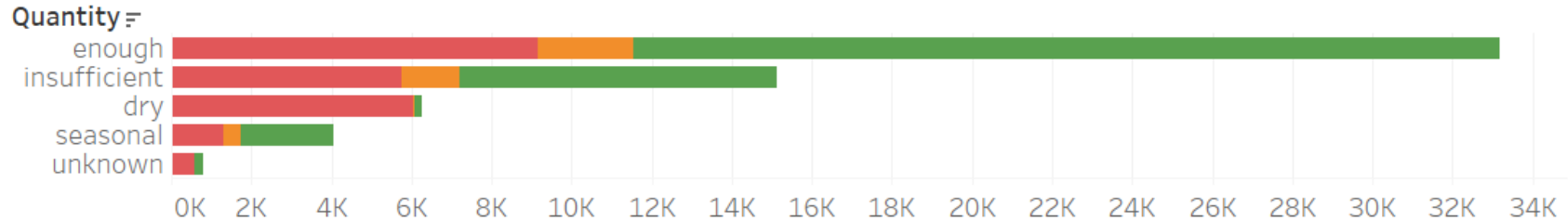


#The **source** of a waterpoint affects its functionality



Ground water is the major source of water, but those water points are more likely to be unfunctional

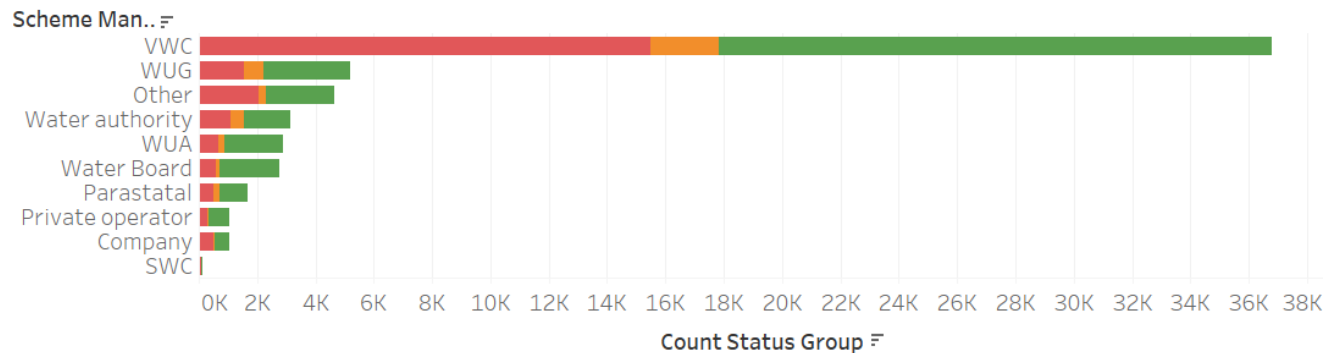
#The **quality and quantity** of the water matters



*Obviously dry water pumps are the most likely to be non-functional.
But not functional rate in those with enough and good water is also worrying!*

#The management of the water point?

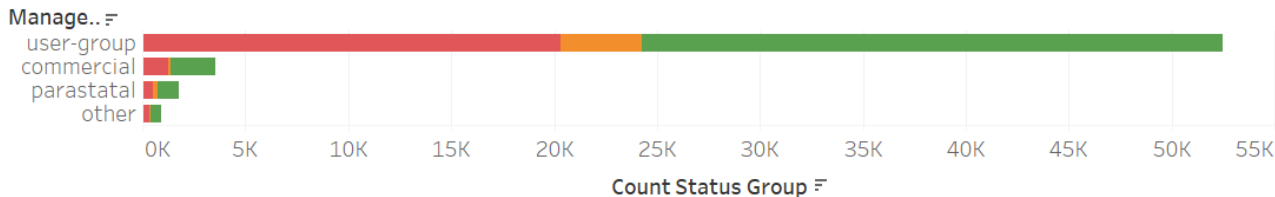
Management Authority



Private operators, minority contributor but they are doing the best job.

User-groups are doing a bigger bulk of work managing water points

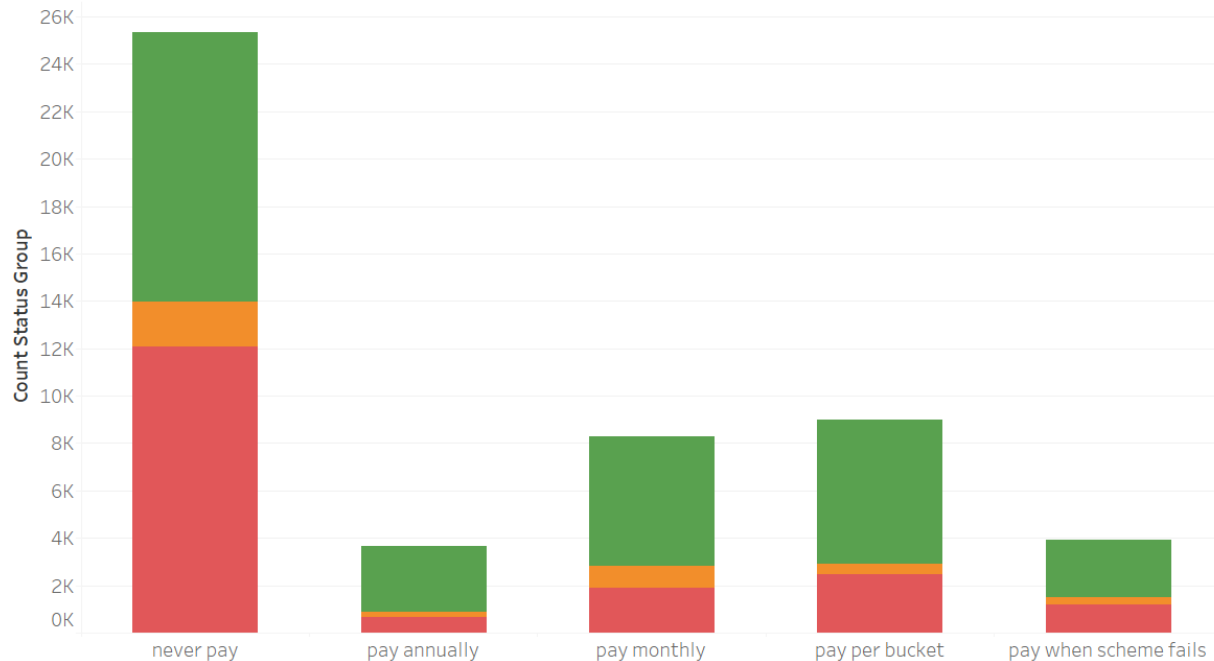
Management Group



#Paid or not paid?

If the water point management charges money, the more likely that it is better maintained and kept functional.

Payment System



A manual water pump stands in a vast, arid landscape. The ground is parched and cracked into a mosaic of irregular polygons. The pump is made of weathered metal, with a long handle that curves upwards and a horizontal spout. The background is a flat, dry plain stretching to a distant horizon under a hazy, orange-tinted sky, suggesting a hot, dry environment.

**Predicting which
water points
need to be
repare?**



Prediction: Functional | Functional but needs repair | Not Functional Water Points

Multiclass Classification Model: Random Forest

The results

79% prediction accuracy .

64% accuracy of a correct prediction of the **minority class** (Not functional or need Repair)

Important features for the prediction:

Gps height (23%)

Years since construction (16%)

Population (14%)

#FUTURE STEPS RECOMENDATIONS

Special focus on the **most vulnerable** water points.

Give **power to the people** enabling Local Management.

An effectiveness and efficiency infrastructure relays on **monitoring** Water Points status

Data is here to help!

#Better data for
better predictions





THANK
YOU!