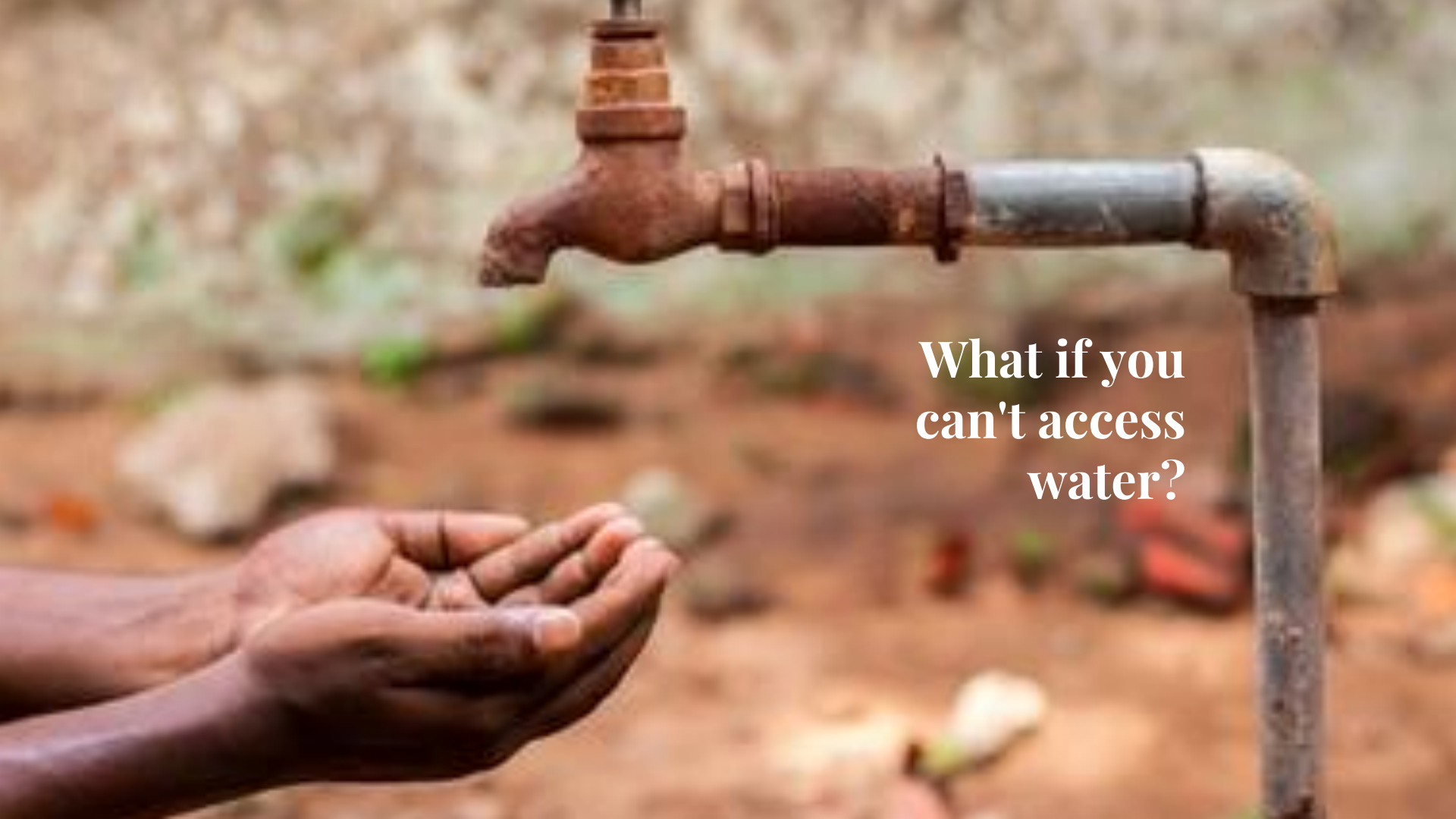




# THE WATER PROJECT

PREDICTING WATER PUMP  
FUNCTIONALITY IN TANZANIA

A project by Elena Salgueiro

A close-up photograph of a person's hands, cupped together, reaching up towards a rusty, outdoor faucet. The faucet is mounted on a metal pipe and has a small, broken spout. The background is a blurred, dry, brownish landscape, suggesting a rural or arid environment. The overall tone is somber and highlights the issue of water scarcity.

**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**

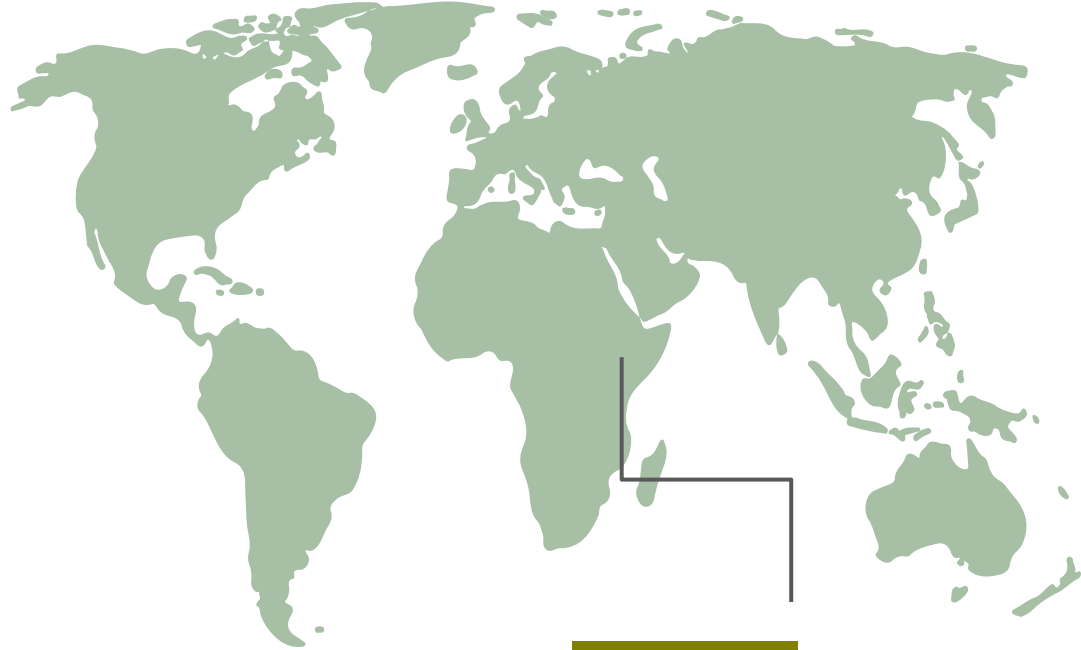


**Economic**



**Equity**

**785 Million** people living  
without access to safe water



**4 Million** in Tanzania

# Tanzania water point campaign



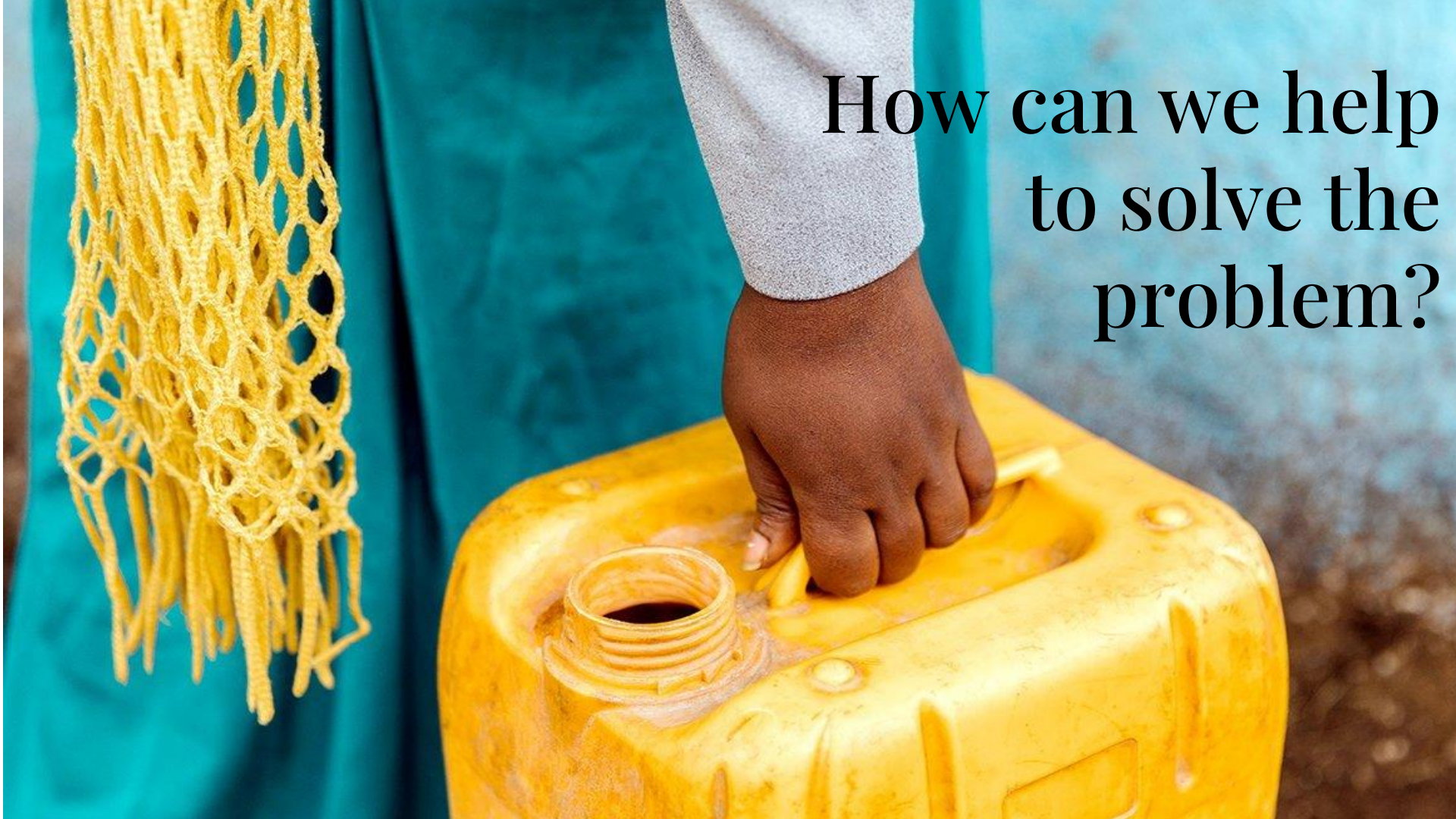
**Hand pumps**

**Damns**



**Comunar  
standpipe**



A close-up photograph of a person's hand, wearing a grey long-sleeved shirt, gripping the handle of a yellow plastic jerrycan. The jerrycan has a white screw-on cap that is removed, showing the dark interior. To the left, a yellow fishing net with a diamond mesh pattern hangs down. The background is a blurred blue wall and brown ground.

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 SOLUTION

## KEY INSIGHTS

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



# #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



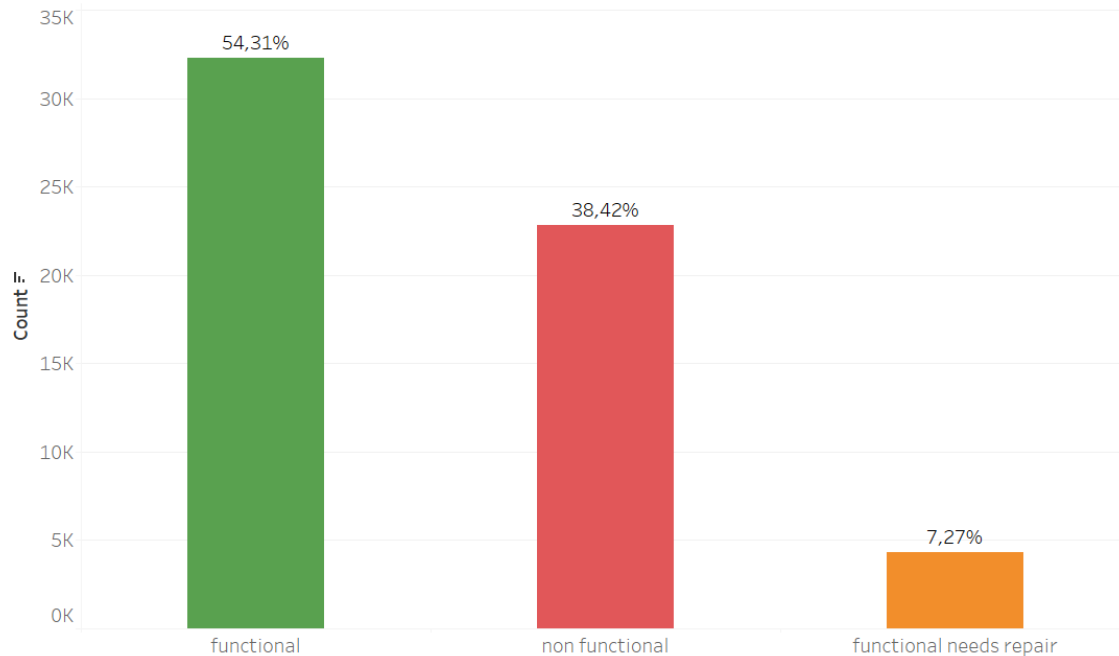
A photograph of a rusty, manual water pump standing in a vast, cracked, and dry landscape under a hazy sky. The pump is made of metal and has a long handle. The ground is covered in a network of deep, irregular cracks, indicating severe drought. The sky is a pale, hazy orange-brown color.

**What does  
the data tell  
us?**



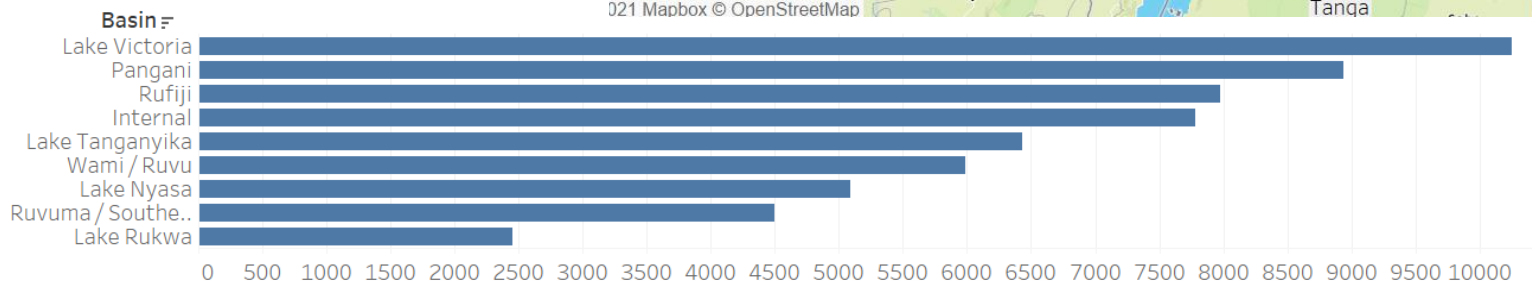
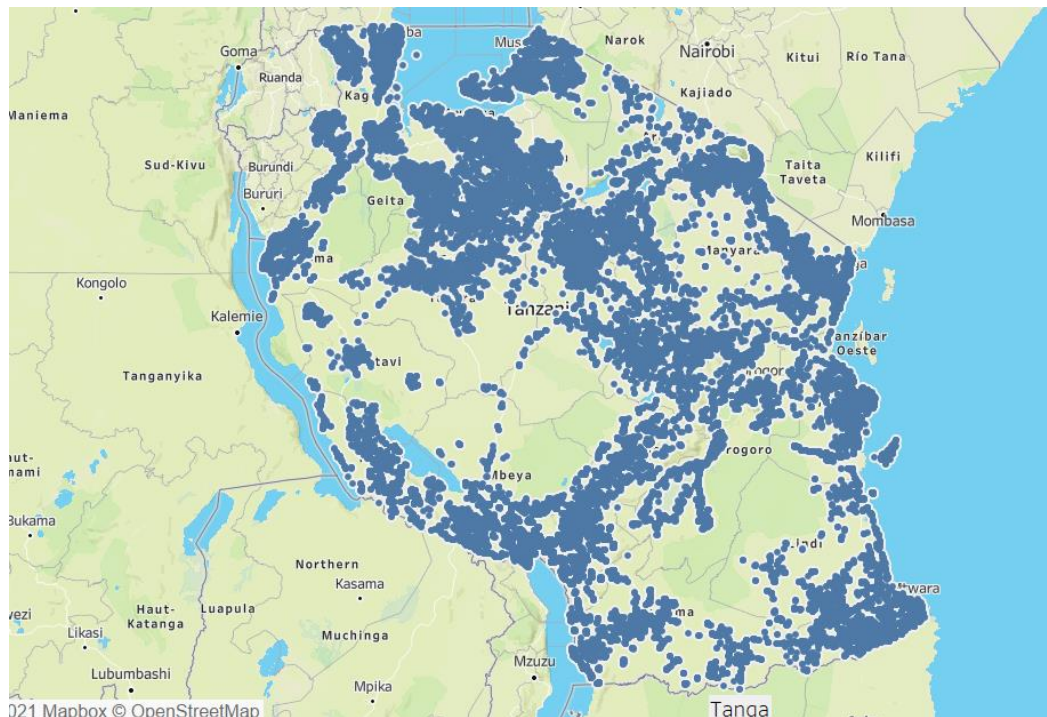
# #Water points functionality status

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

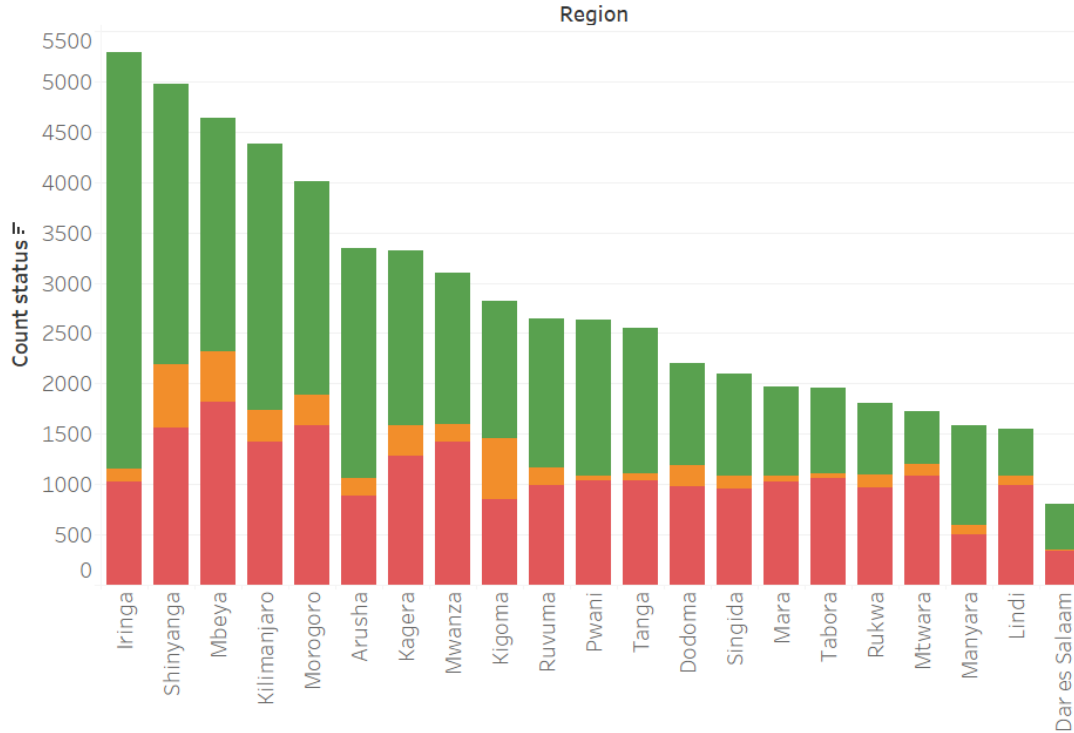


# #Geographical distribution

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



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



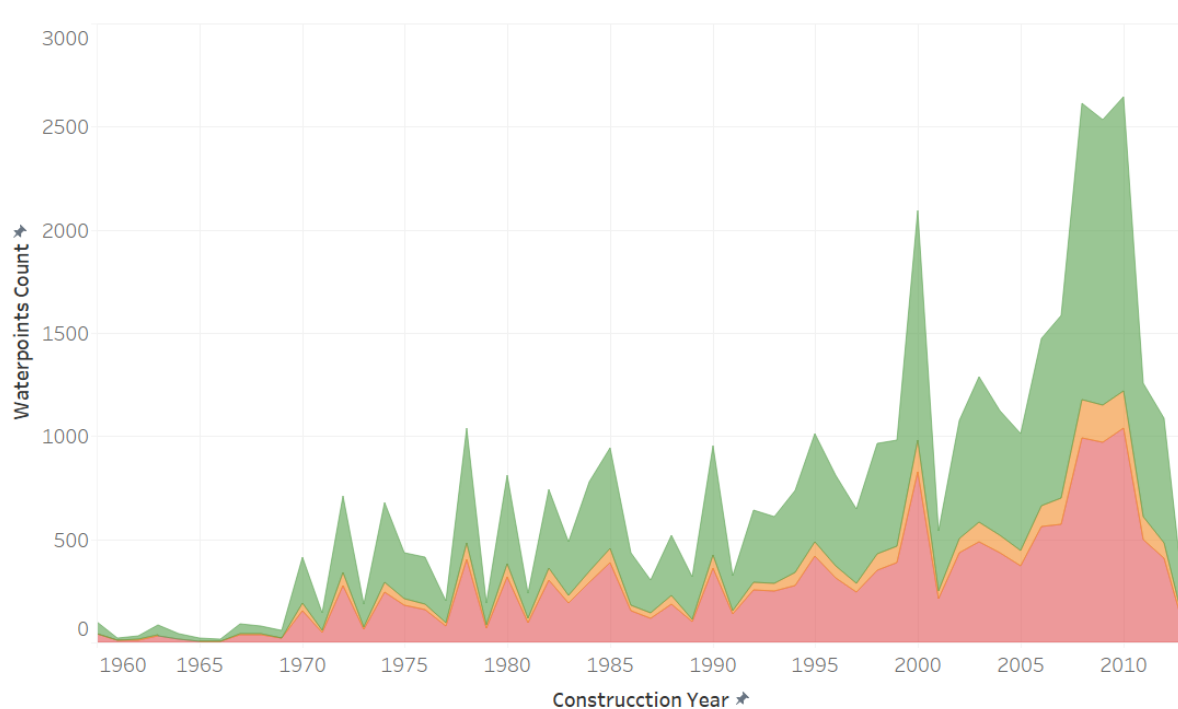
*Non functional rate is extremely high in some regions.*



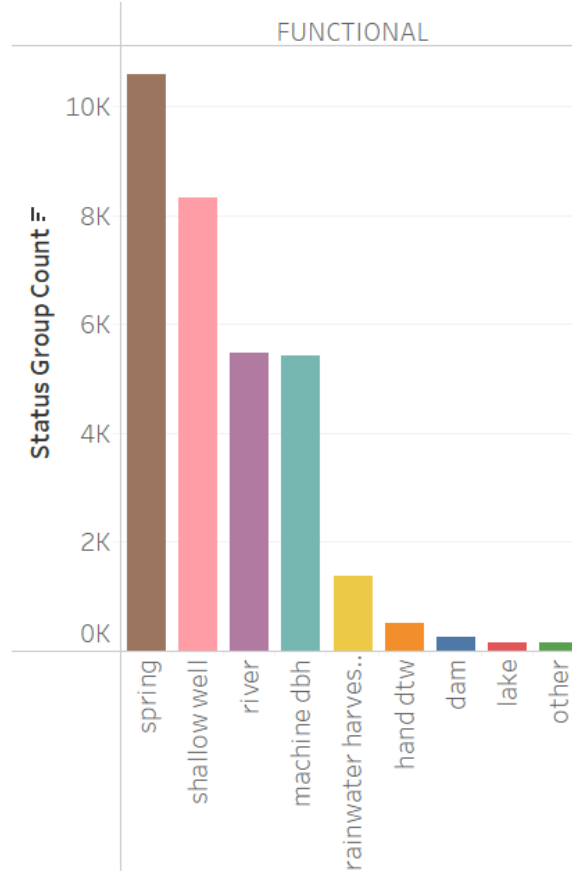
# #How does the **age** of a waterpoint relate to its functionality?

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

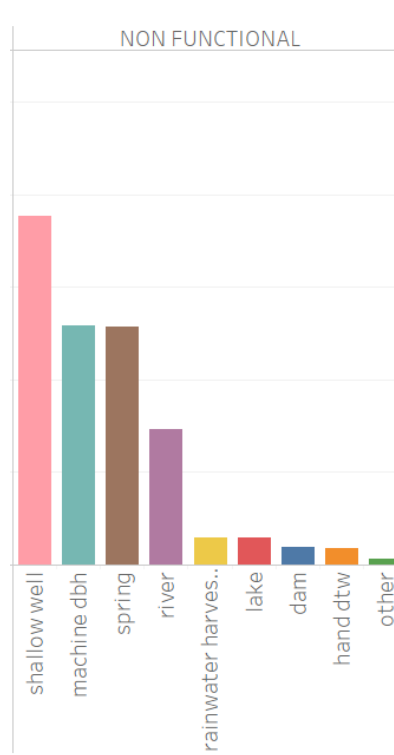
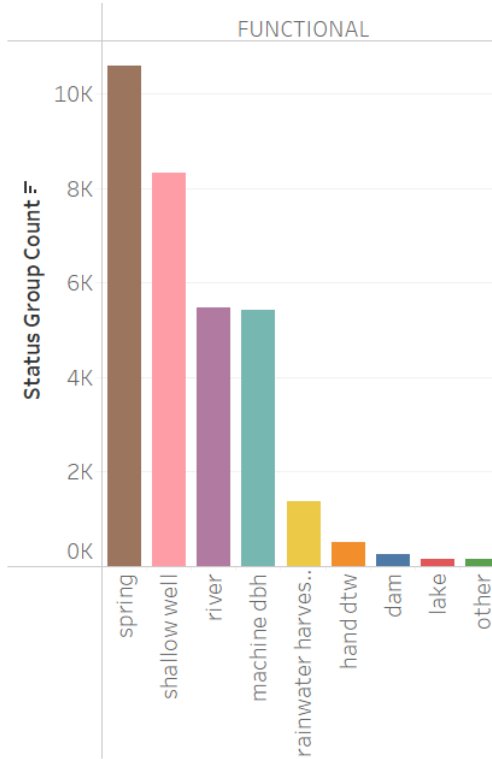
*This is very worrying!*



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



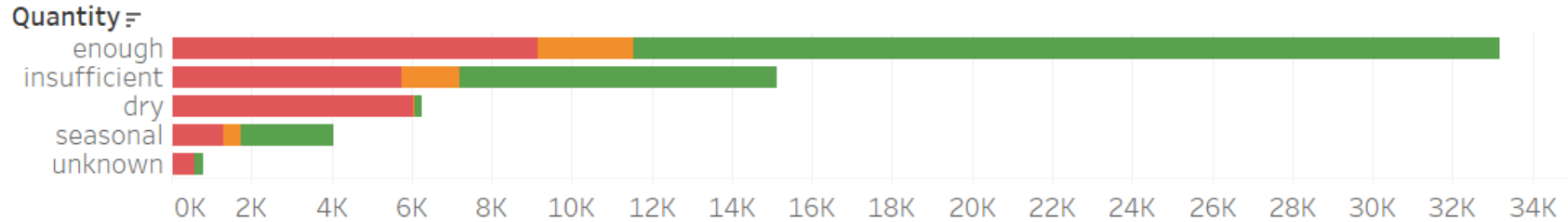
# #The **source** of a waterpoint affects its functionality



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



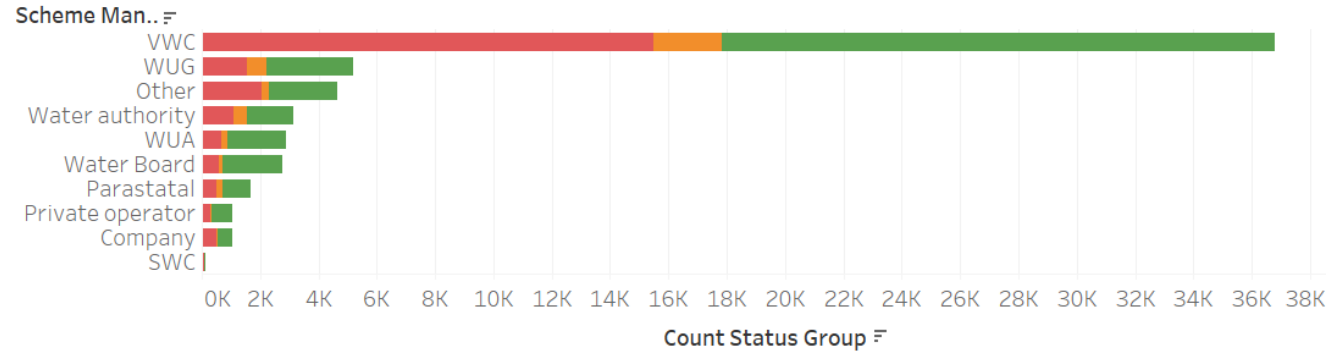
# #The **quality and quantity** of the water matters



*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?

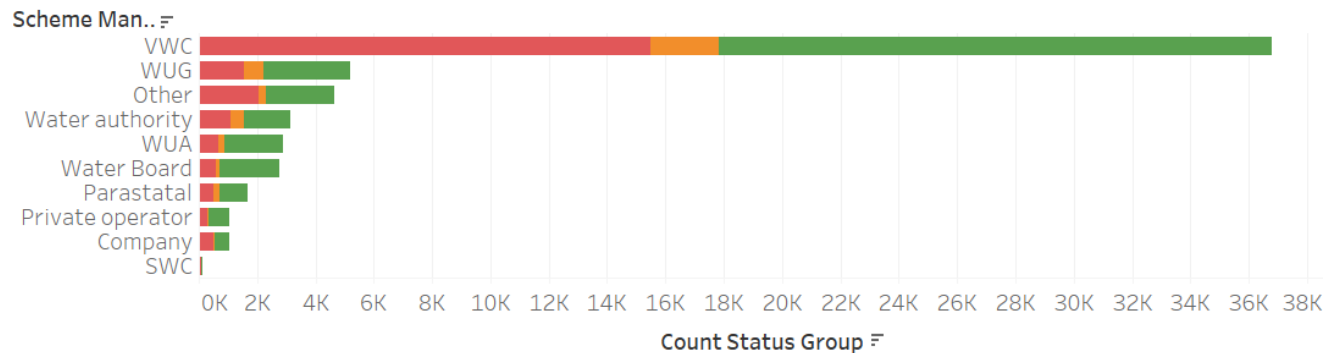
## Management Authority



*Private operators, a minority contributor, are doing the best job.*

# #The management of the water point?

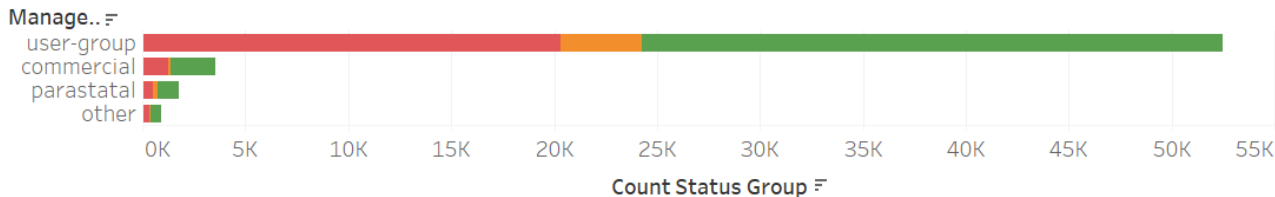
## Management Authority



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

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

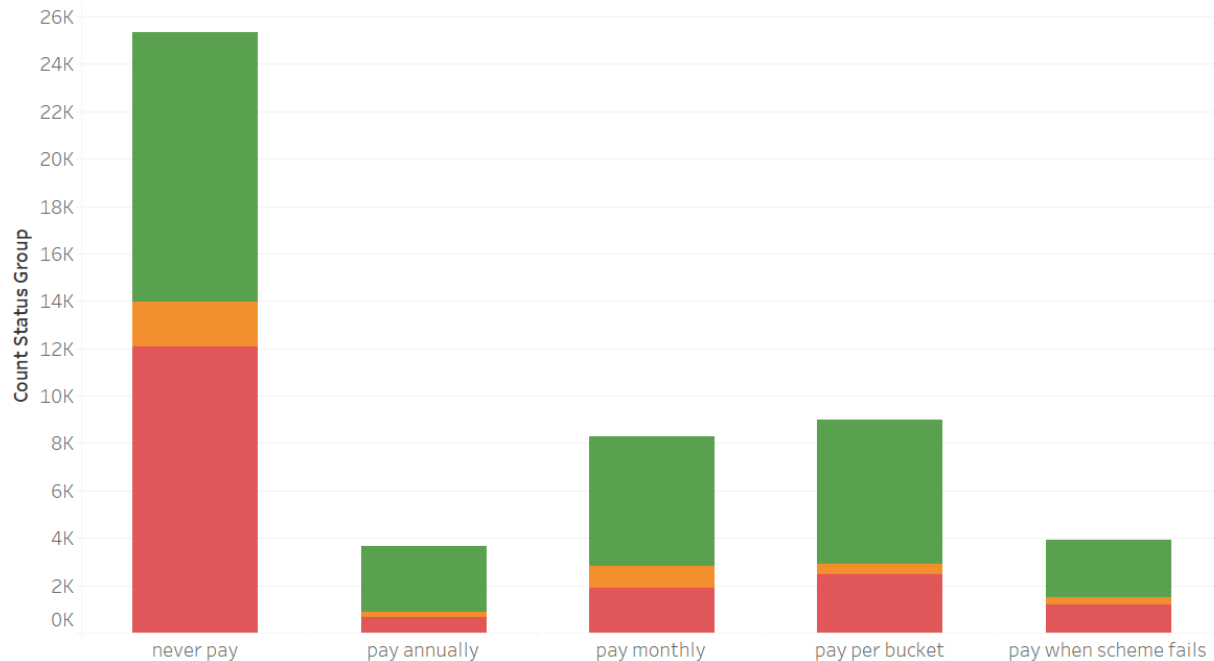
## Management Group



## #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, curved handle on the left and a short spout on the right. The background is a flat, brown expanse meeting a pale, hazy sky at a distant horizon.

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



**Predictions**   Functional | Functional but needs repair | Not Functional Water Points

**Multiclass Classification Model:** Random Forest

## #The results

**76%** prediction accuracy .

**60%** accuracy of a correct prediction of the **minority class** ( Not functional or need Repair)

# #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!