

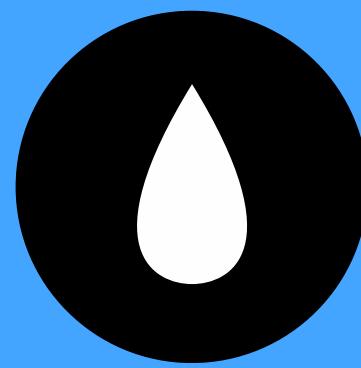
# PUMP IT UP!!!!

## Data Analysis on Tanzania's Water Wells

Predicting Water Well Functionality

By: Mohamed Katherhassan

# overview



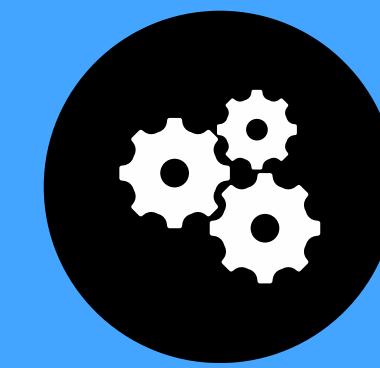
Background



Purpose



Insight



Model



# Tanzania's Water Crisis



**16 million**

people (28% of the population)  
lack access to safe water.

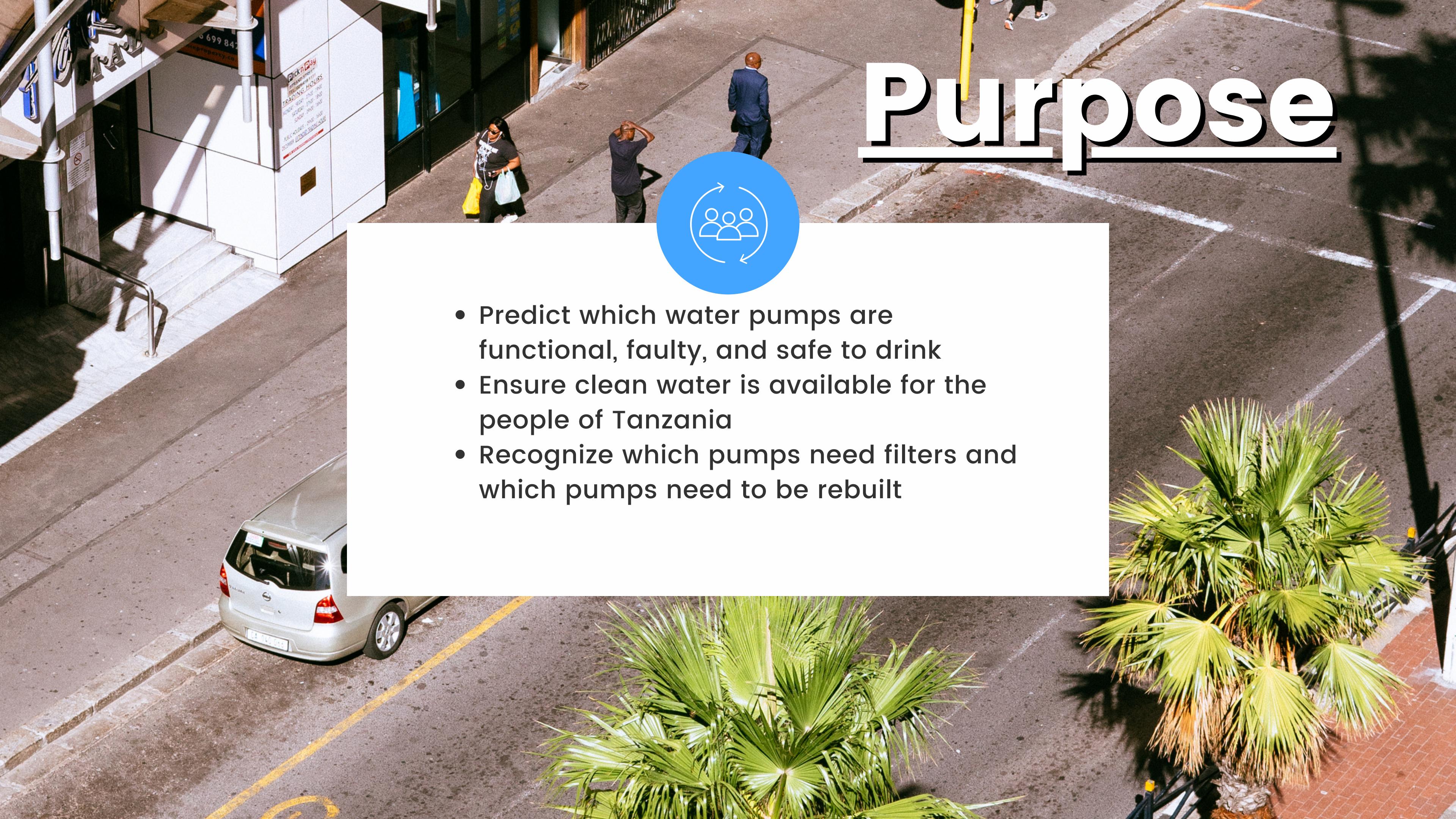
**44 million**

people (73%) lack access to safe  
sanitation facilities.

# Purpose

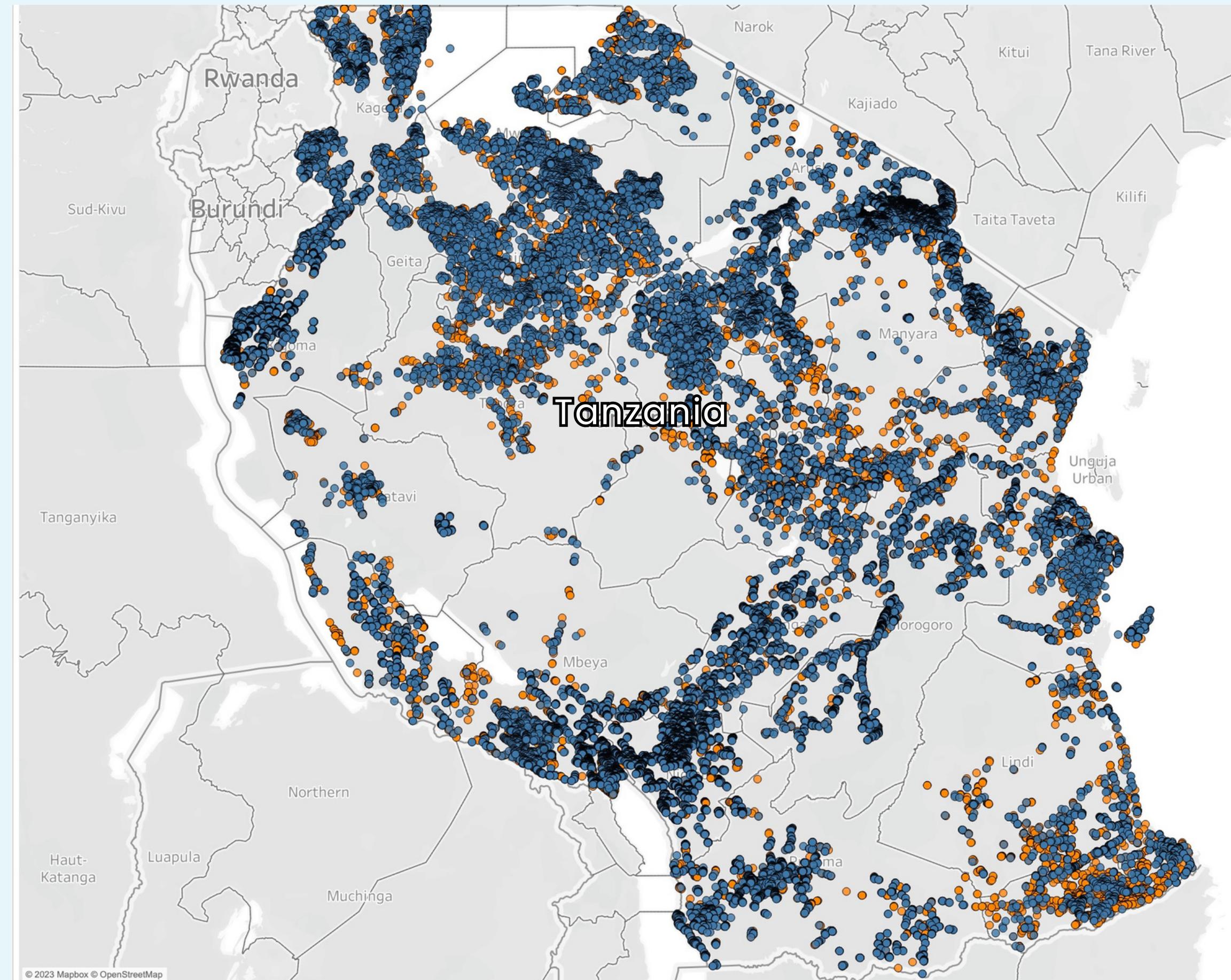
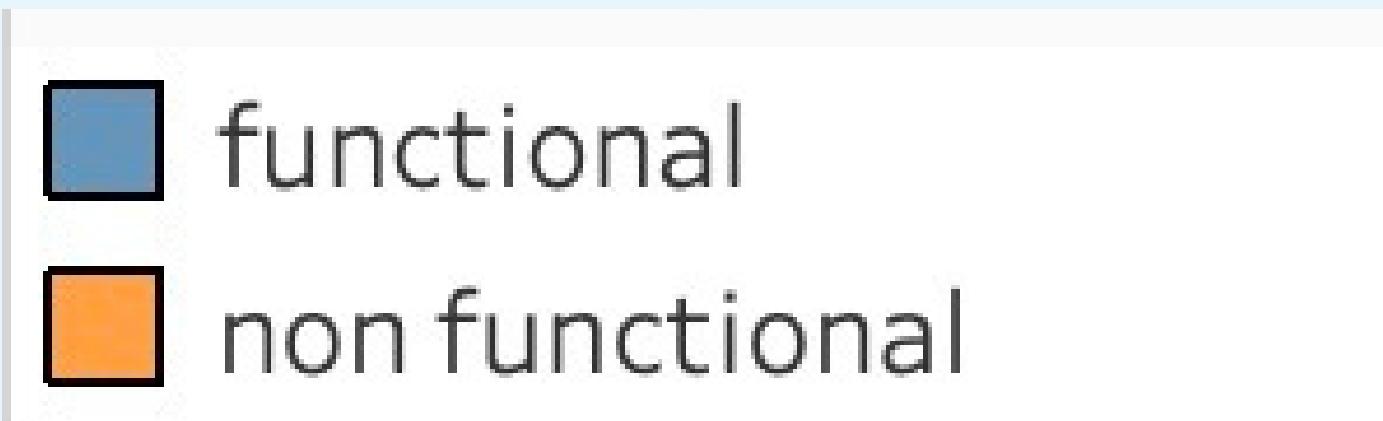


- Predict which water pumps are functional, faulty, and safe to drink
- Ensure clean water is available for the people of Tanzania
- Recognize which pumps need filters and which pumps need to be rebuilt



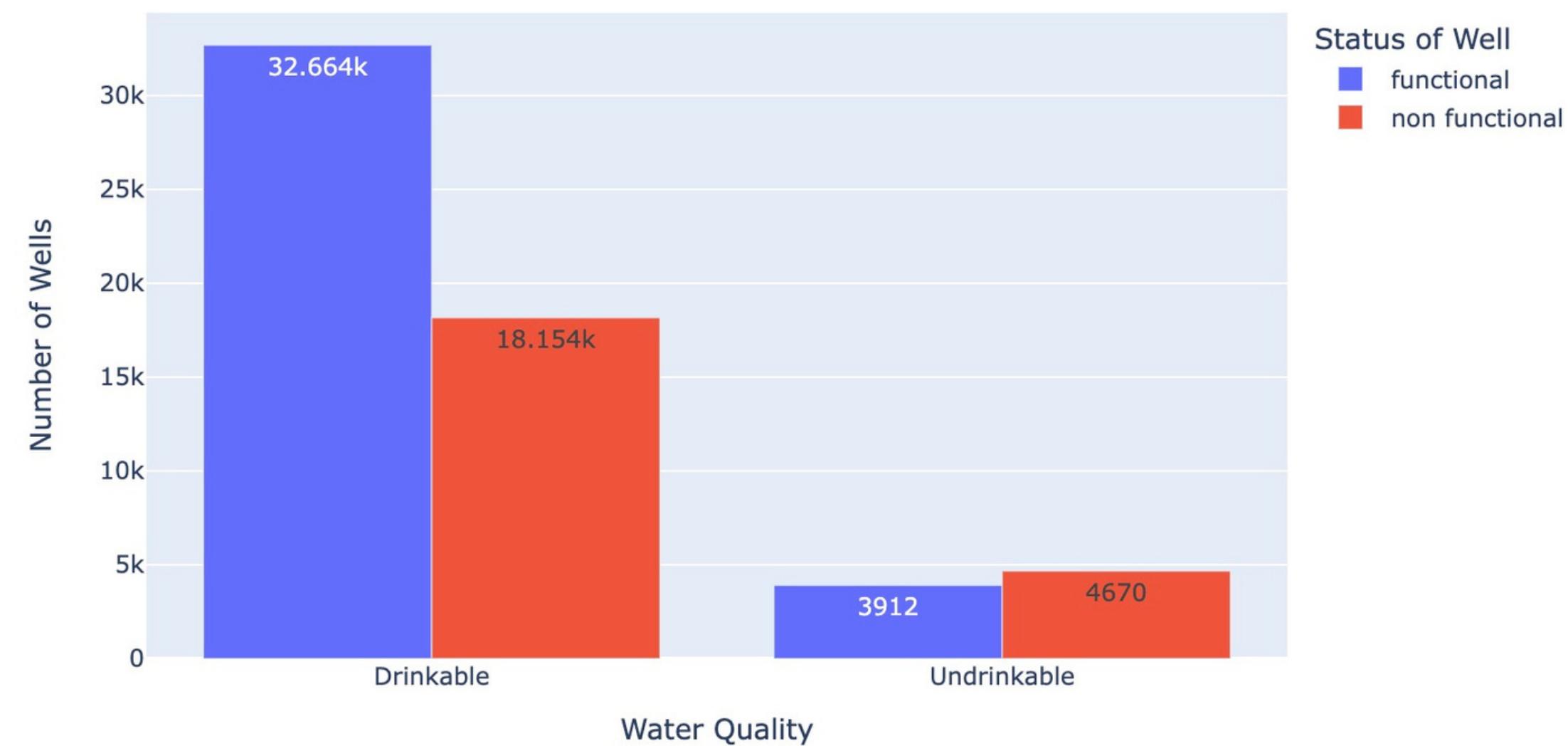
# Insights

59,000 Wells  
scattered  
throughout Tanzania



# Water Quality

Drinkable Water per Status of Well



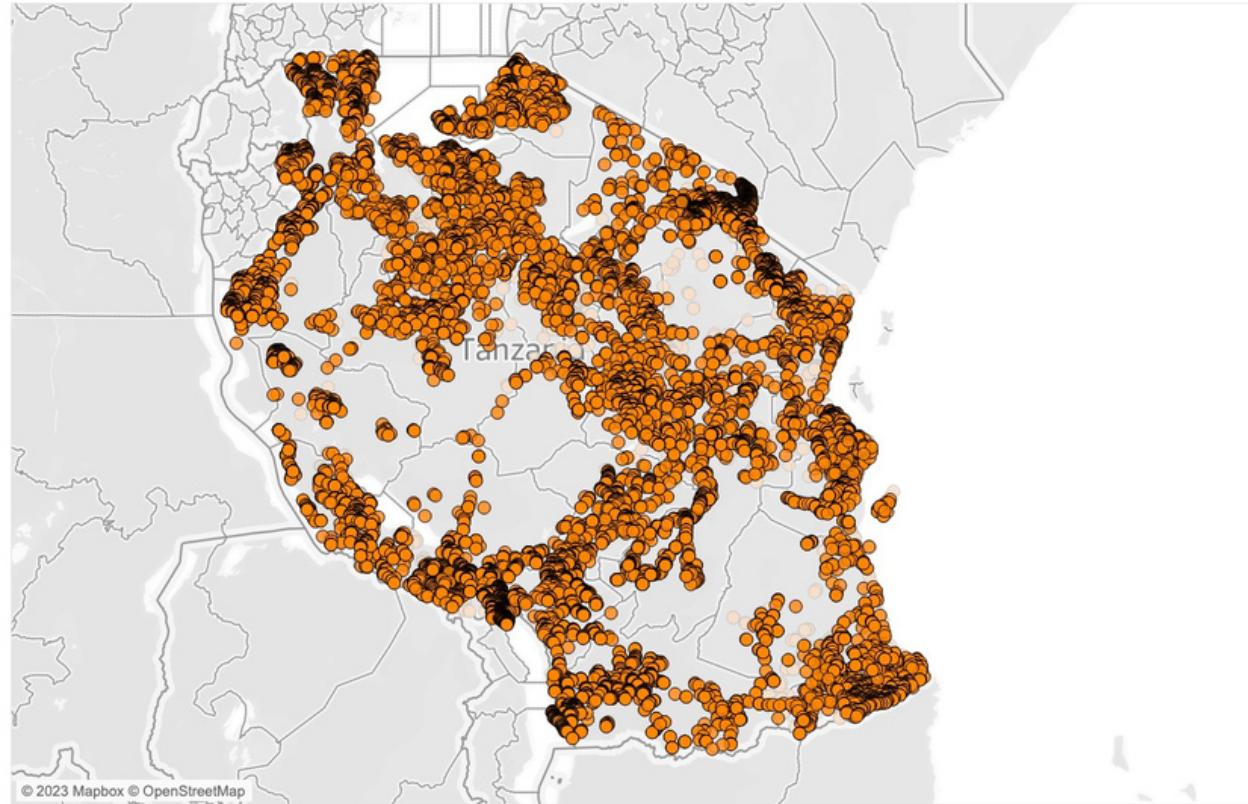
A total of **50,000** wells are safe to drink

**18,000** are Non Functional

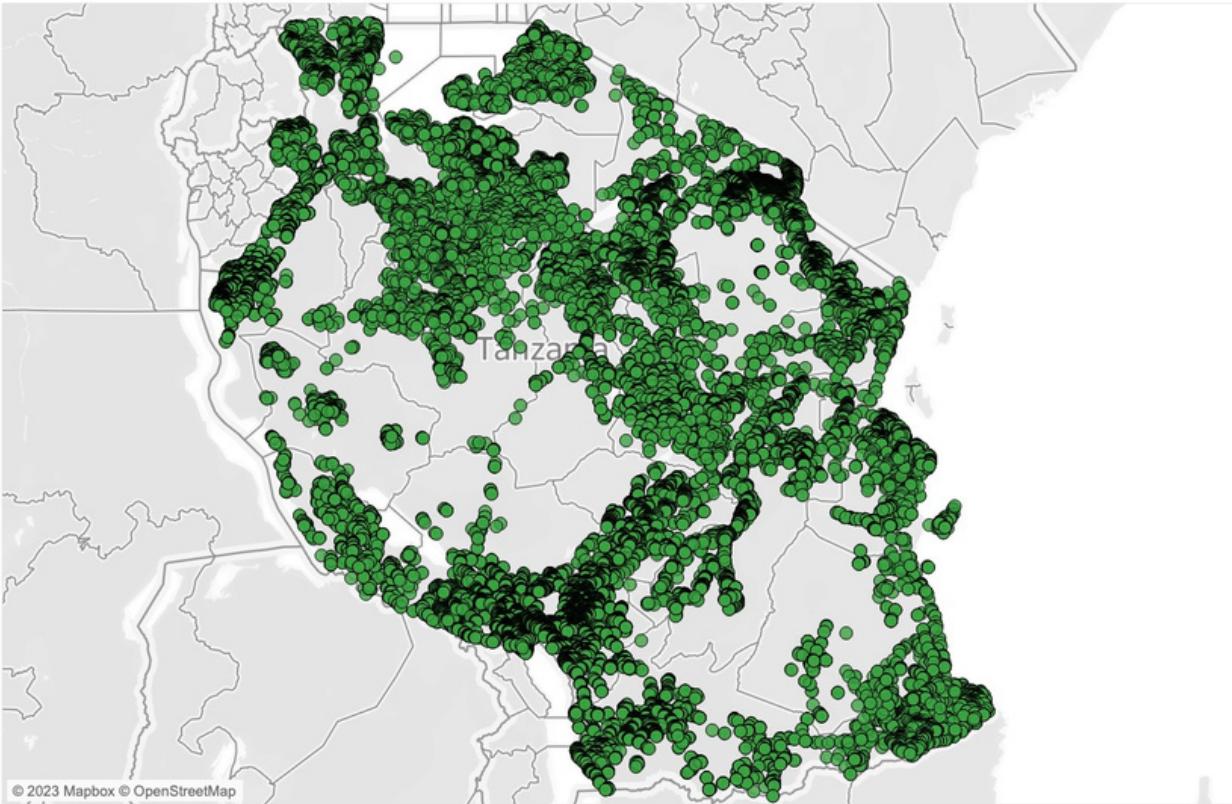
**3,900 Functional wells with undrinkable water**

# 18,000 Non Functional Pumps

The Status of Water Wells



The Quality of Water

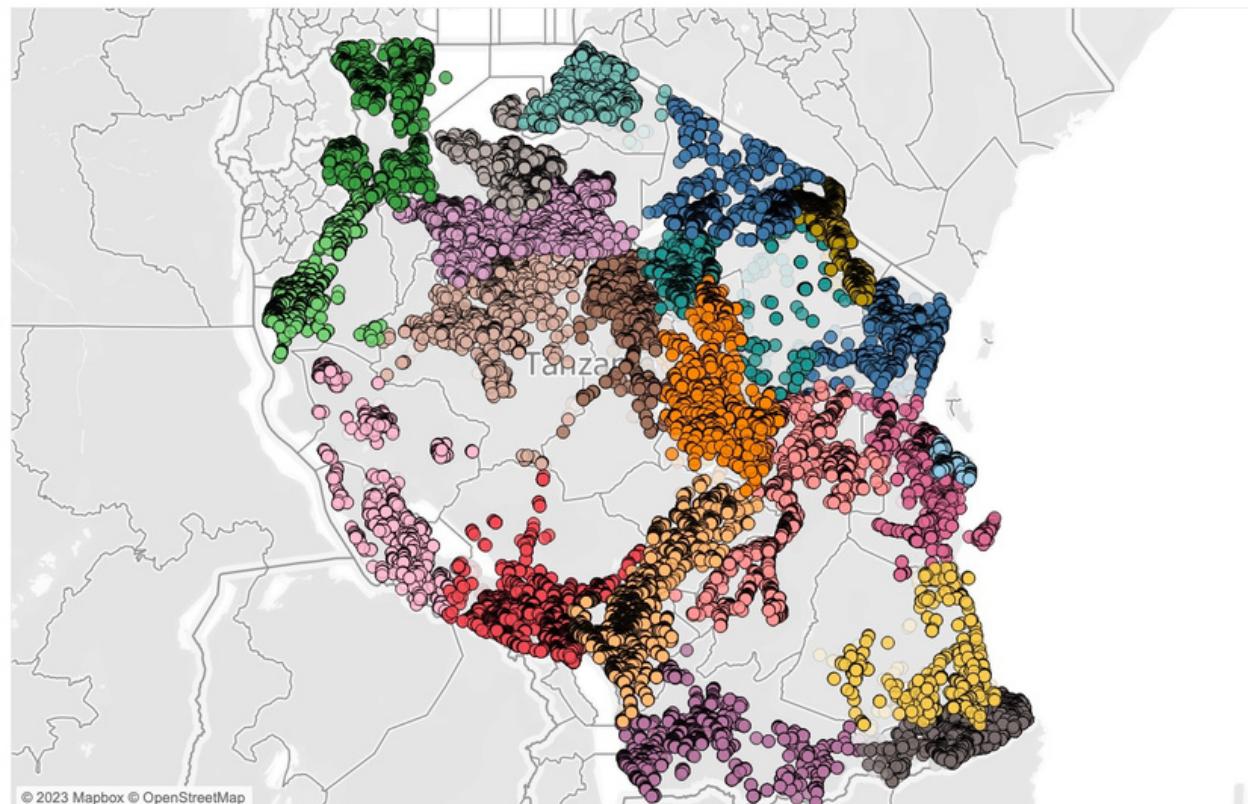


Status Group  
non functional

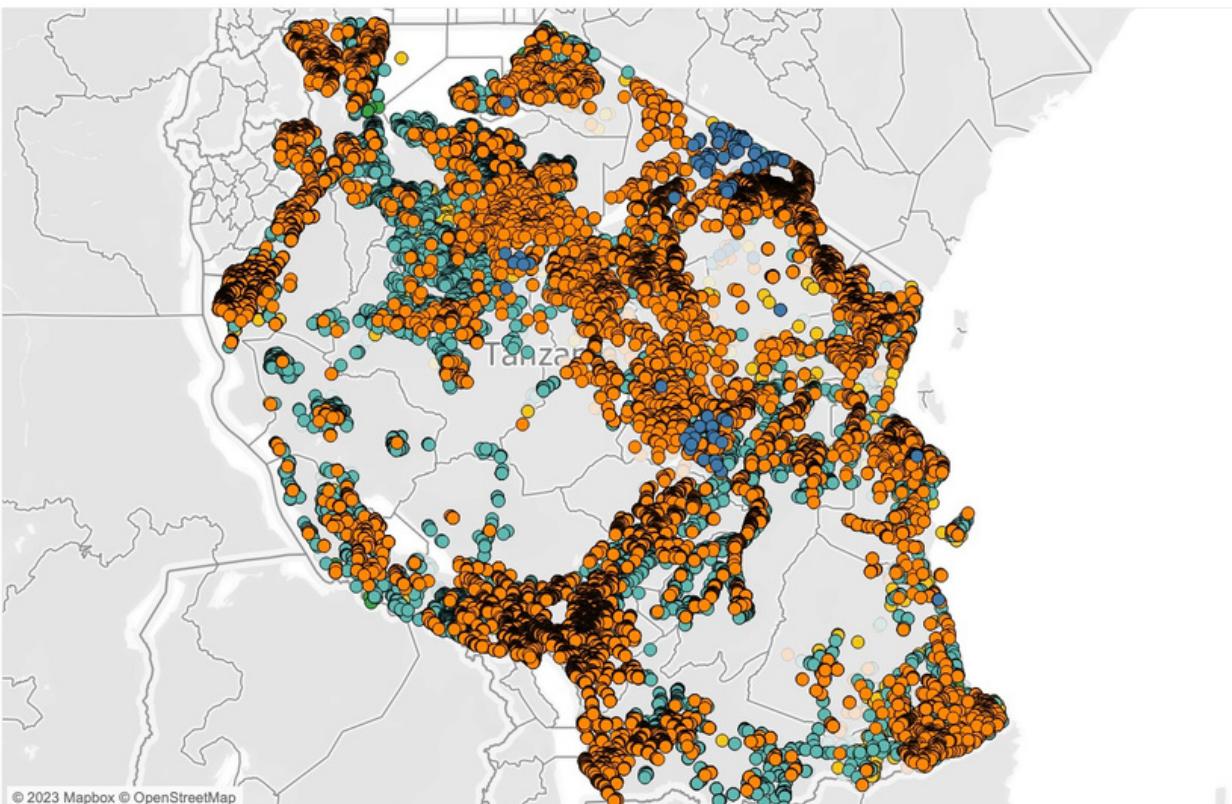
Binary Water Qual  
Drinkable

Region  
Arusha  
Dar es Salaam  
Dodoma  
Iringa  
Kagera  
Kigoma  
Kilimanjaro  
Lindi  
Manyara  
Mara  
Mbeya  
Morogoro  
Mtwara  
Mwanza  
Pwani  
Rukwa  
Ruvuma  
Shinyanga  
Singida  
Tabora  
Tanga

The Regions of Water Wells



Types of Pumps

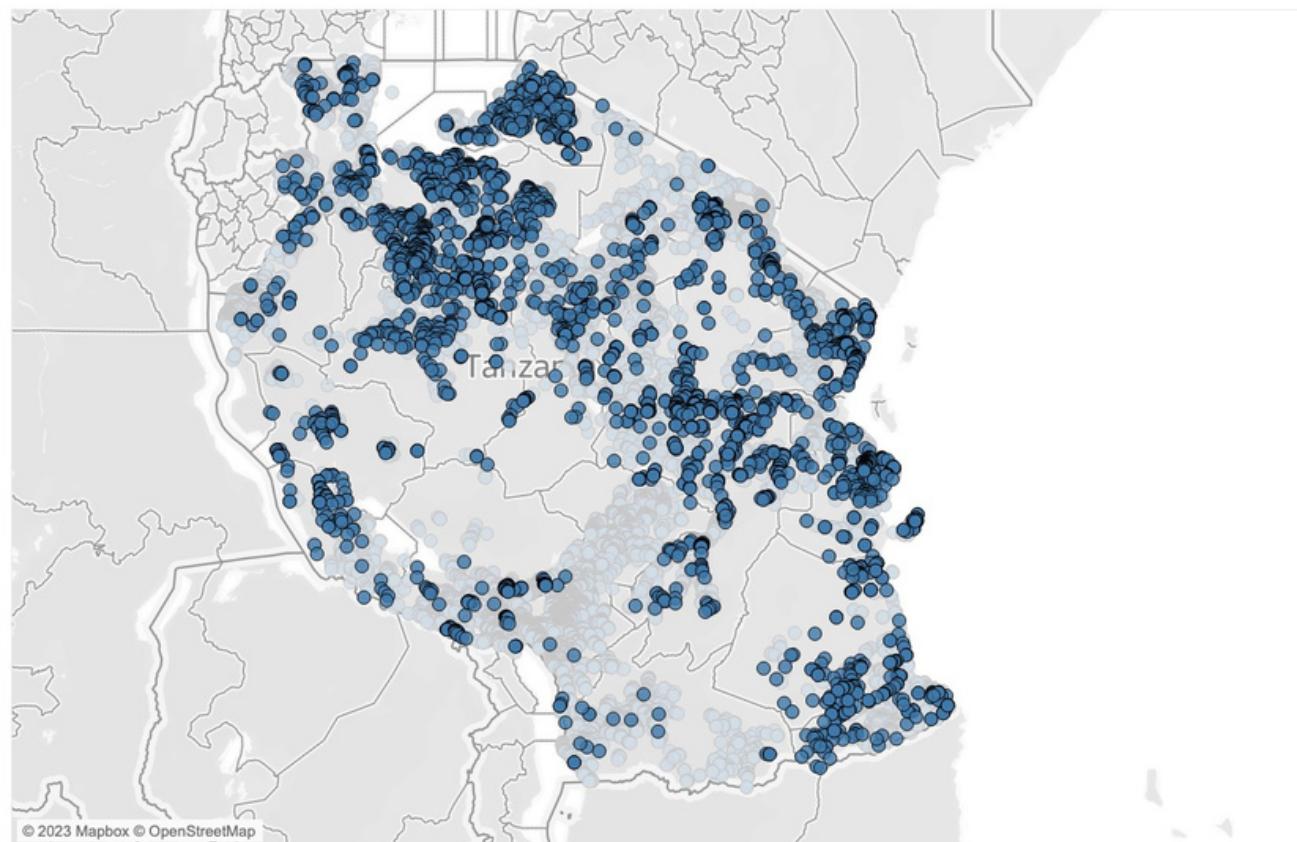


Waterpoint Type Group  
cattle trough  
communal standpipe  
dam  
hand pump  
improved spring  
other

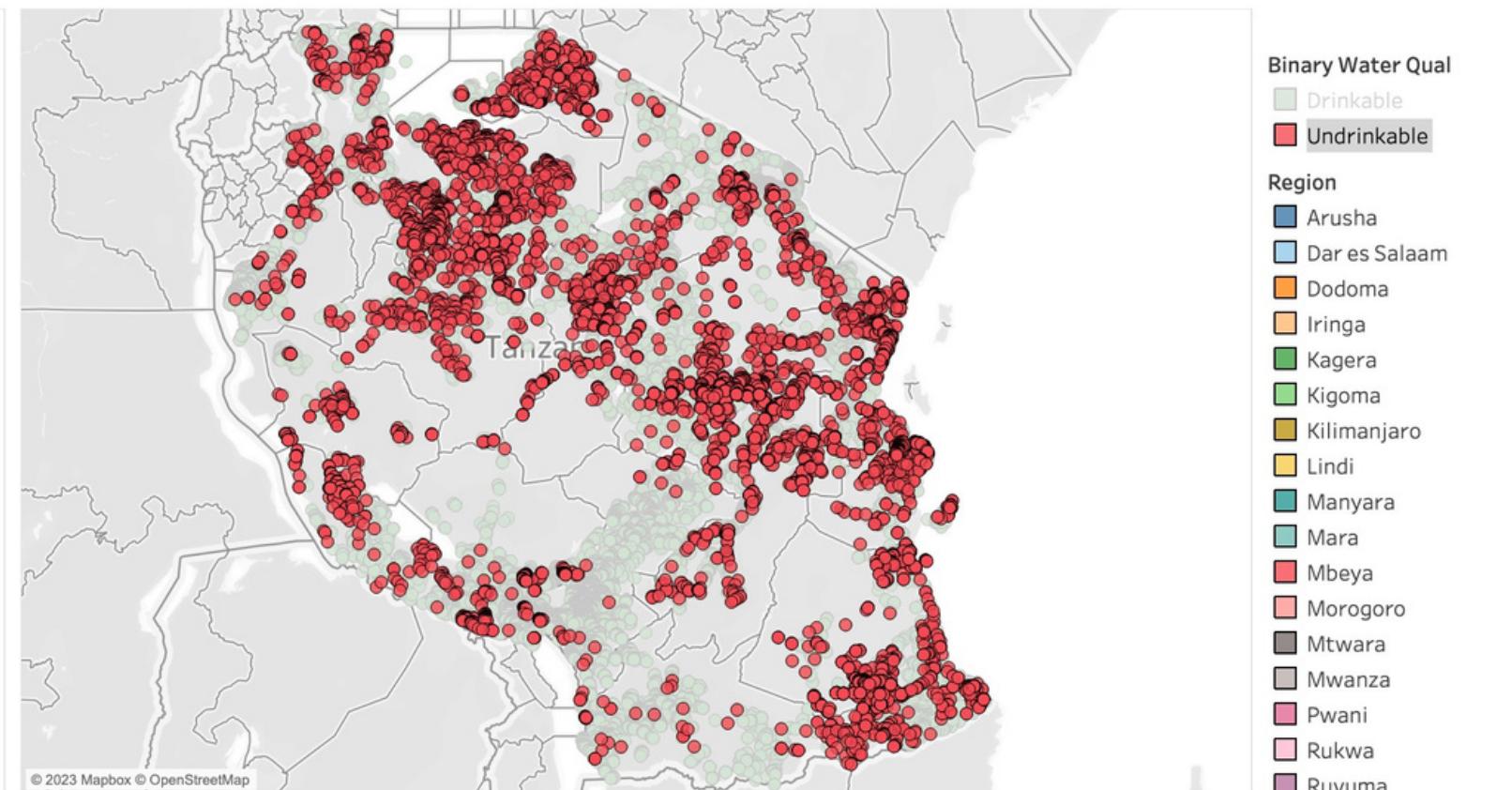
We  
need  
repairs  
for  
these  
pumps

# 3,900 Functional wells with Undrinkable water

The Status of Water Wells



The Quality of Water



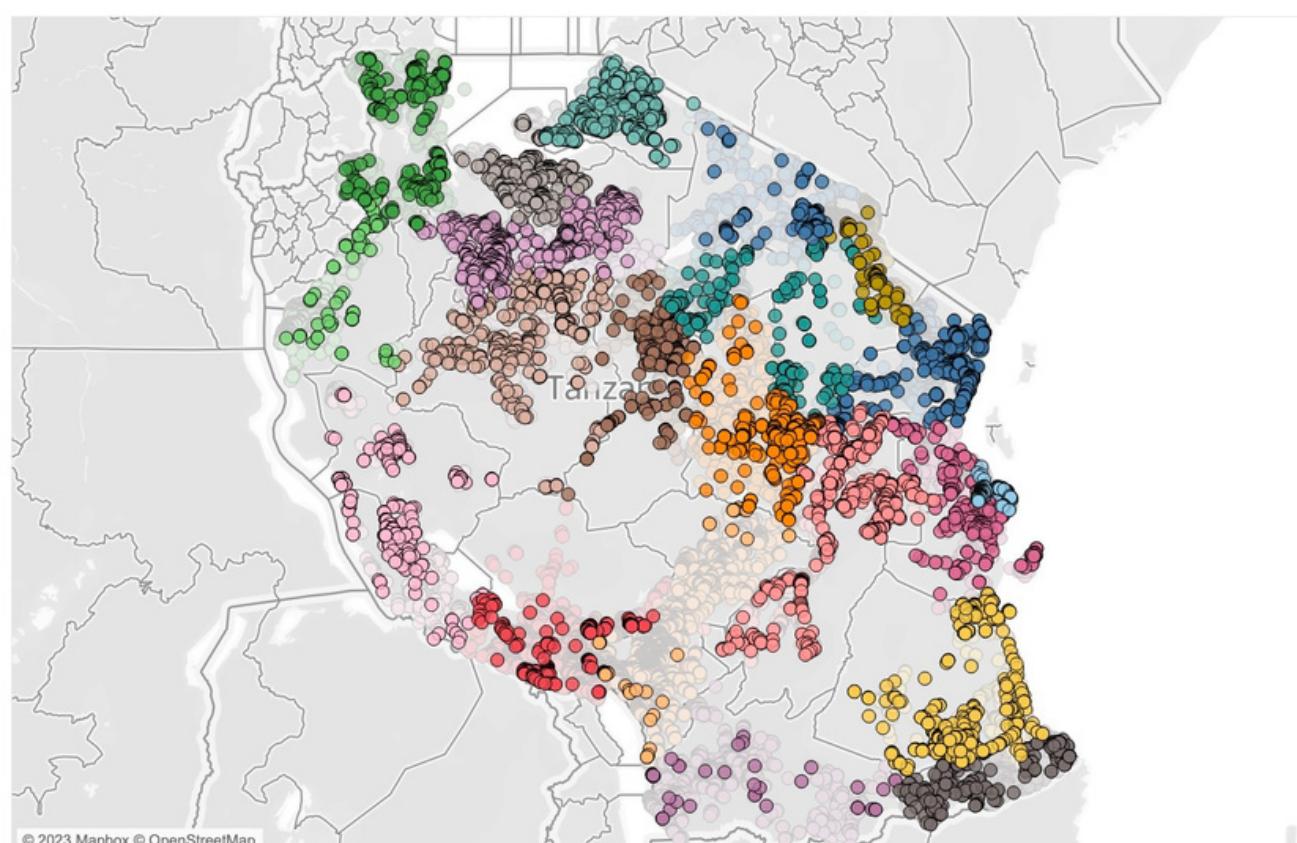
Status Group  
functional

Binary Water Qual  
Drinkable  
Undrinkable

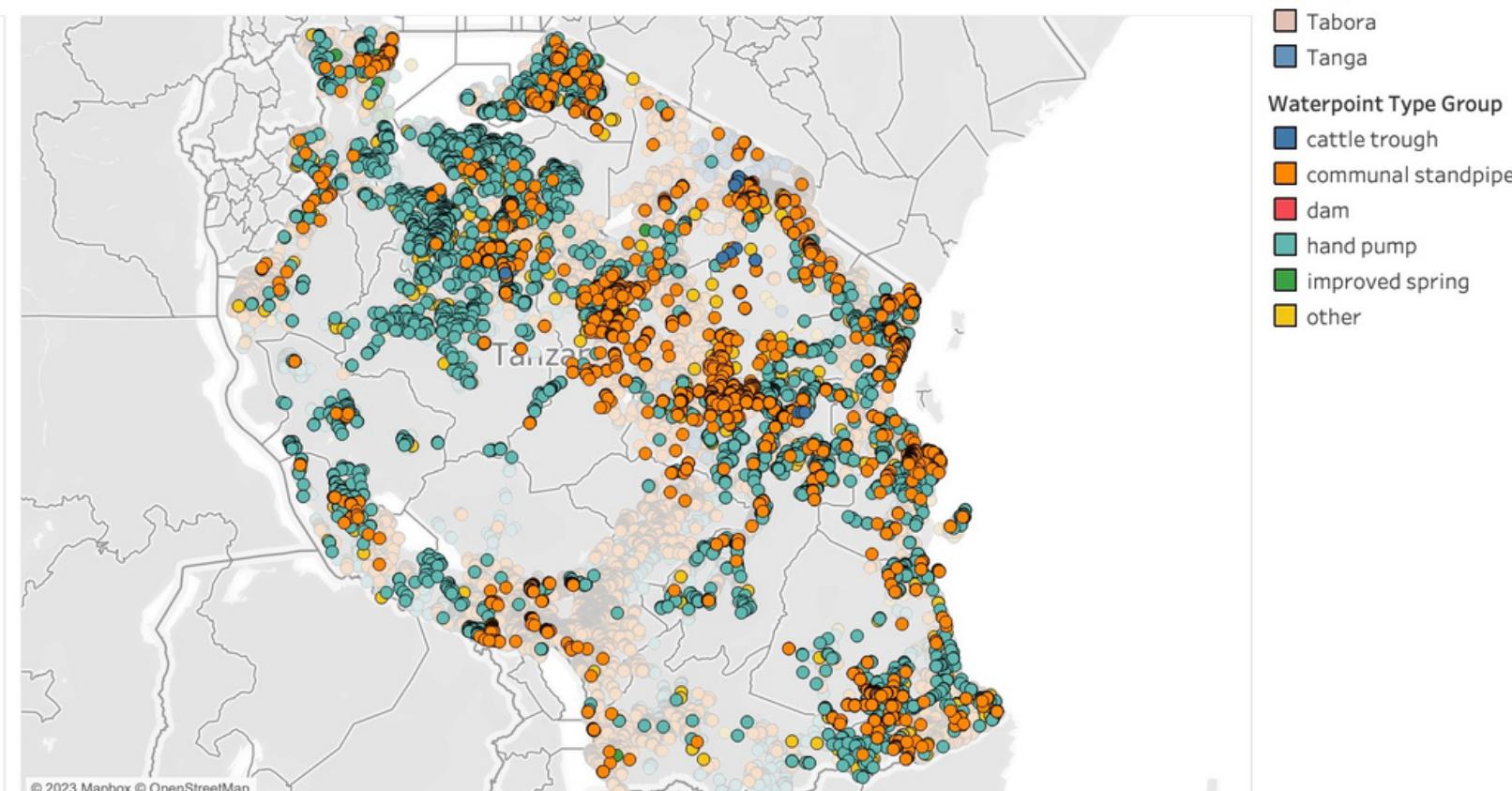
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Waterpoint Type Group  
cattle trough  
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dam  
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The Regions of Water Wells



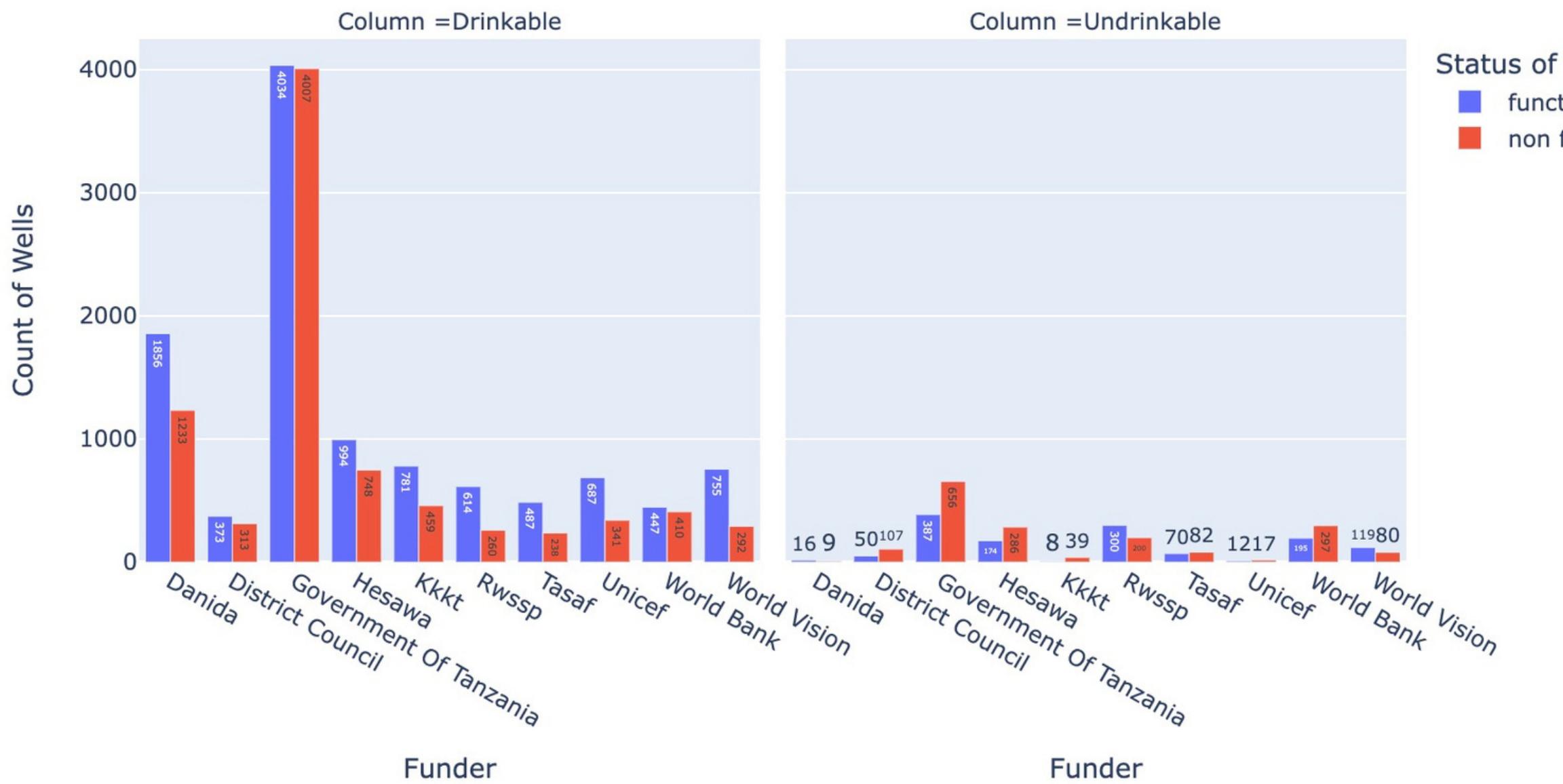
Types of Pumps



We  
need  
filters  
for  
these  
wells

# Funding

Top 10 Funder of the Water Wells



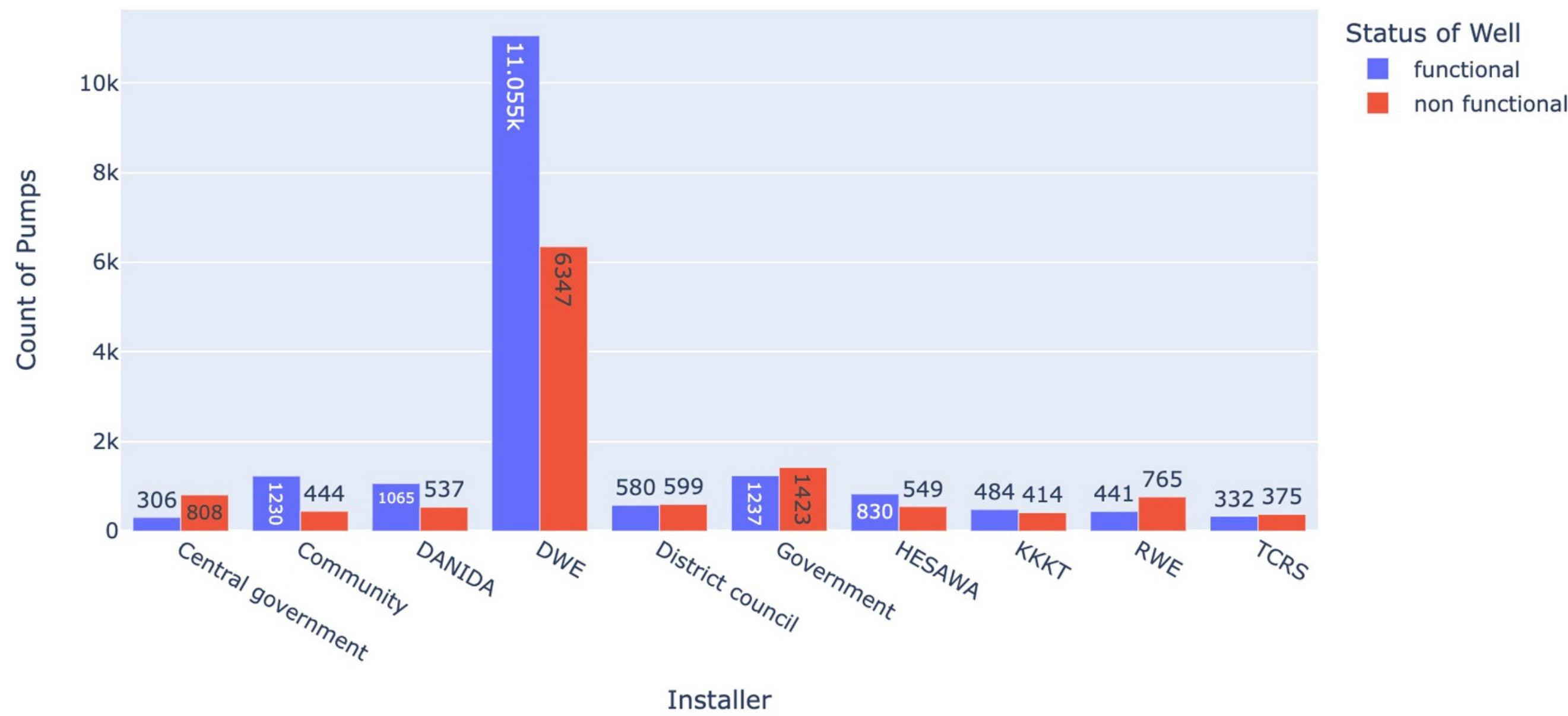
We Need Funds for Filters

When looking only at building wells that are Drinkable and Functional

1. Government Of Tanzania
2. Danidan (Denmark)
3. Hesawa
4. Kkkt
5. World Vision

# Installer

Top 10 Installer of the Pumps



With 11,000  
pumps installed  
and Functional,  
DWE is the best!

# Recommendations

- **Filters**

Prioritize Functioning wells that need filters, that can yield safe water

- **Install**

Prioritize getting the best installer to install pumps that last a long time

- **Funding**

Allocate funds from effective and reliable organizations

- **Region**

Target repairs and filtration for region which high populations

# Model

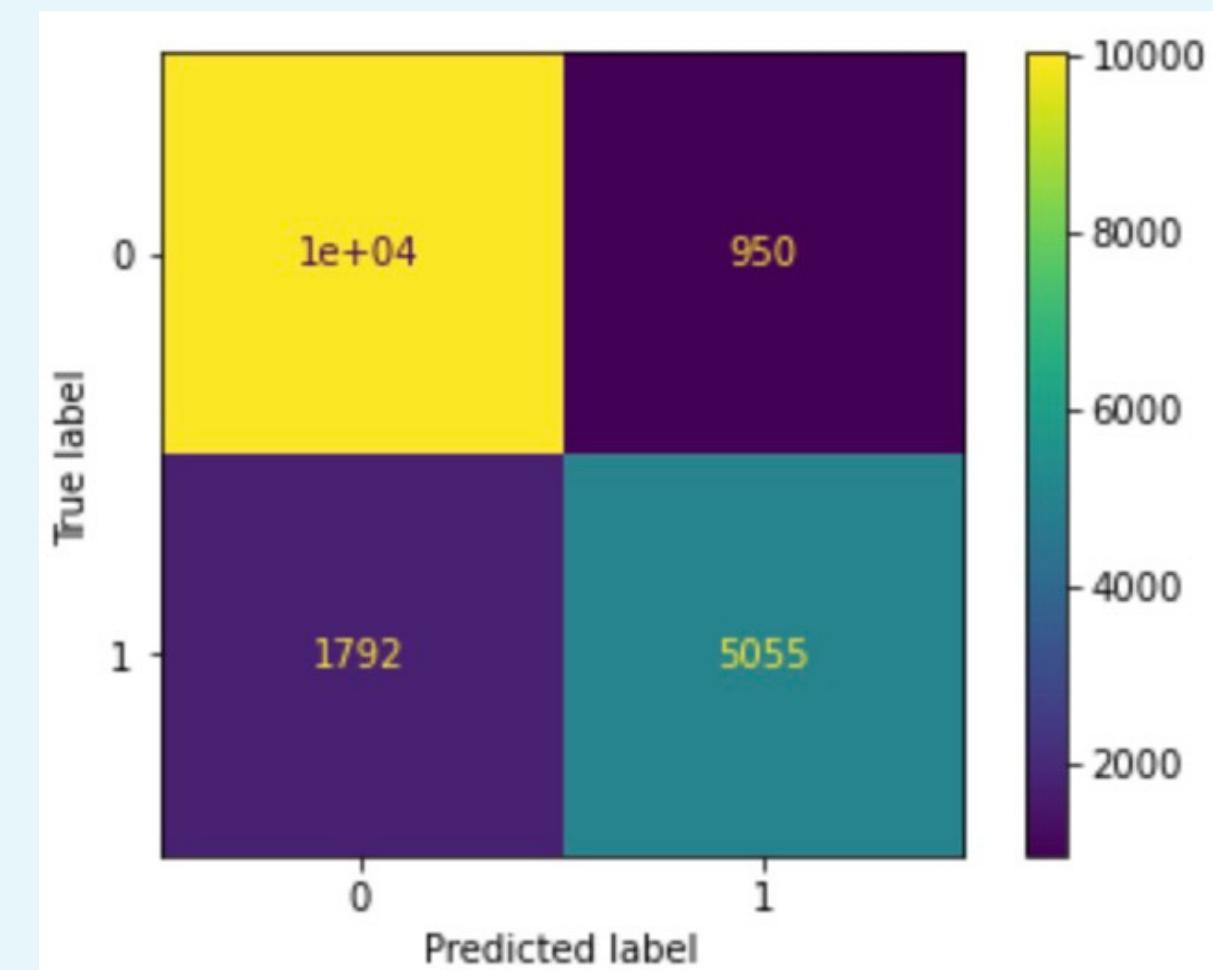
MODEL	ACC	AUC
Logistic Regression	81%	88%
LR Hyper-Tunned	82%	88%
Random Forest	78%	83%
RF Hyper-Tunned	85%	91%
XG Boost	82%	88%
XGB Hyper-Tunned	83%	90%

For finding functionality of wells, there are many features.

Here is the Top 5:

1. The Quantity of Water in a Well
2. The Construction Year
3. The Extraction Pump Type
4. The Altitude of the well
5. Amount Water Available

RF Hyper-Tunned



A photograph of a woman in a red shirt and a pink and yellow patterned skirt operating a hand-operated water pump. She is pulling down on the long metal rod attached to the pump handle. Water is flowing from a blue PVC pipe connected to the pump. The background is filled with dense tropical foliage and green plants.

How can you help?

You can Donate at  
[water.org/donate](https://water.org/donate)

Questions?