Pump it Up: Tanzania Water Pump

By Shenghao (Lavender) Zhang

Agenda

Overview

Problems to Look at

Models

Findings

Overview

Potable water access is important to Tanzanians. Many areas use different types of water pump.

Can data help us to understand what's behind the operation?

Problems to solve

1 Would water characteristics affect the operation of the pump?

2 Would human associated features affect the operation of the pump?

3 Are there any geographical distribution of pumps in different functionality status?

4 Are there any particular characteristics standing out that can affect the functional status of the pump?
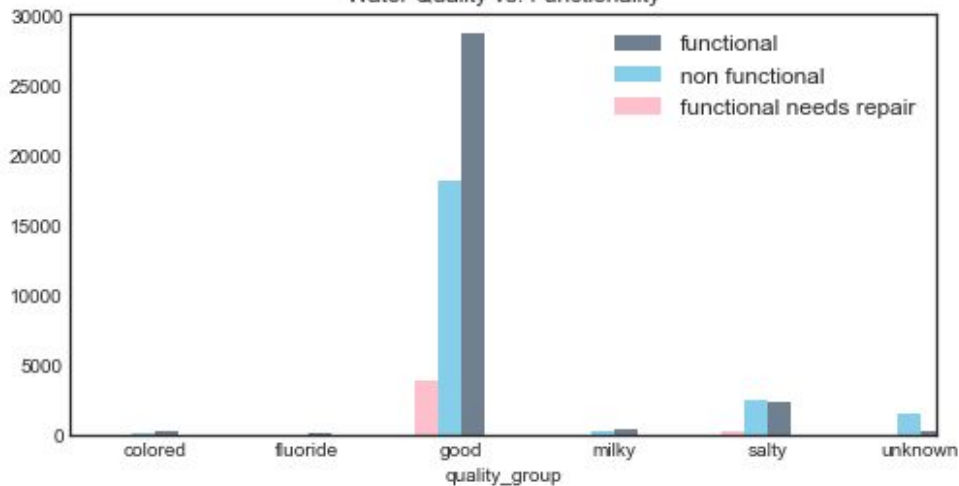
Graphs & Finding
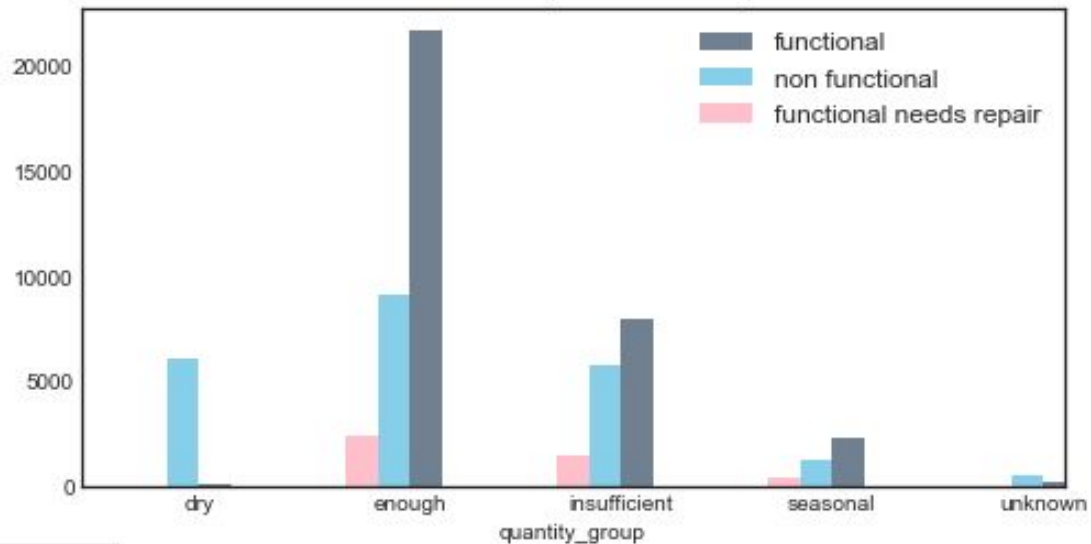
What have been spotted from the data analysis?

Water

Does quality and quantity affect pump operation?
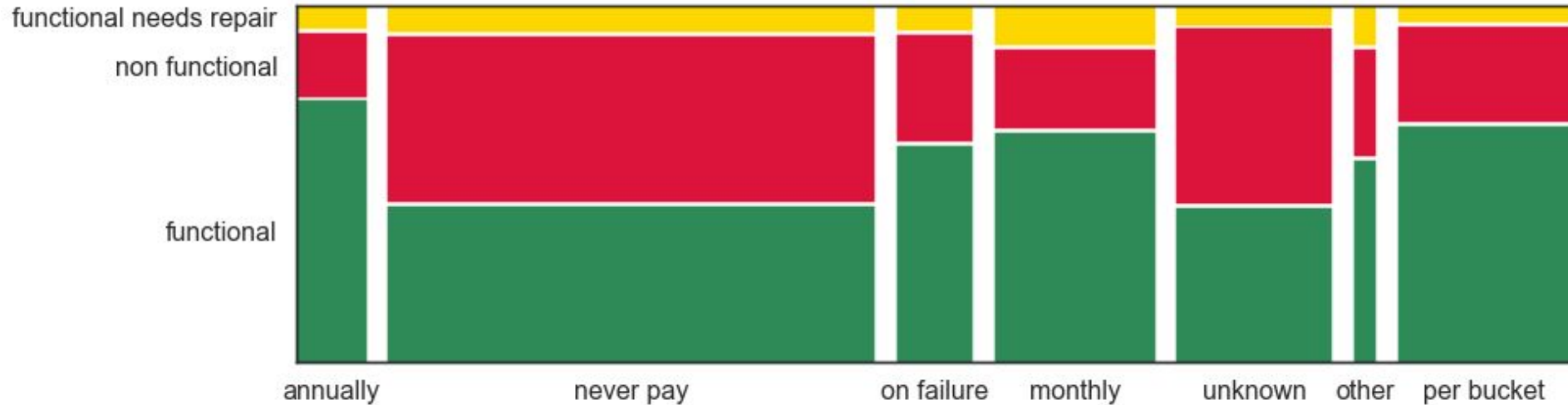

Water Quantity vs. Functionality
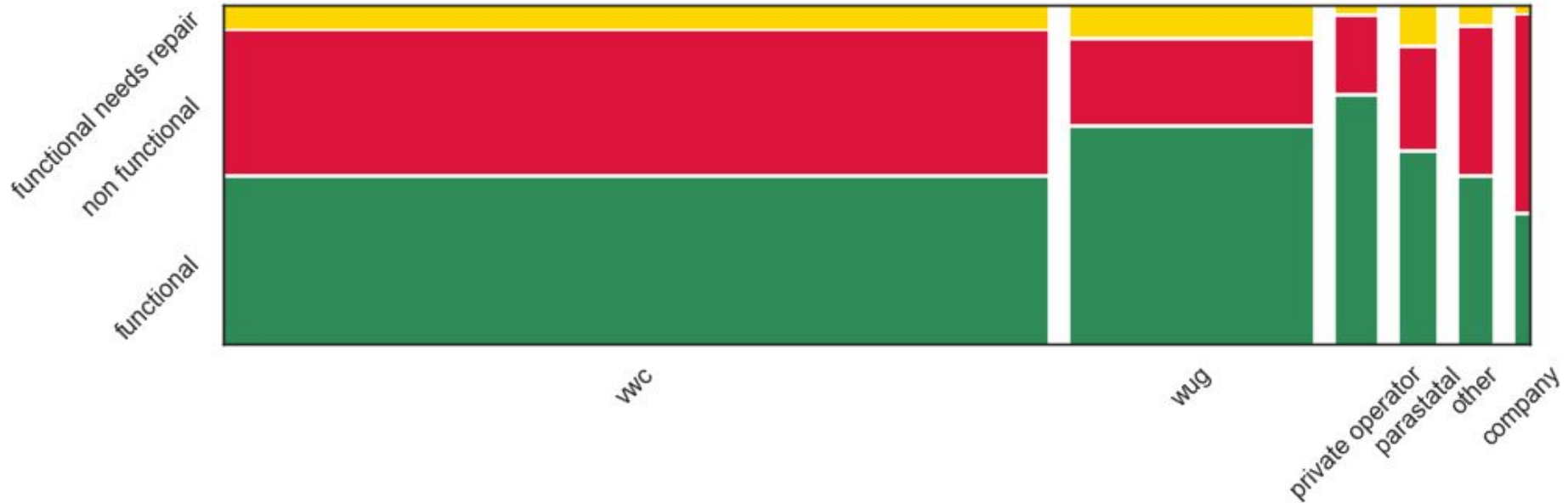

Water Quality vs. Functionality

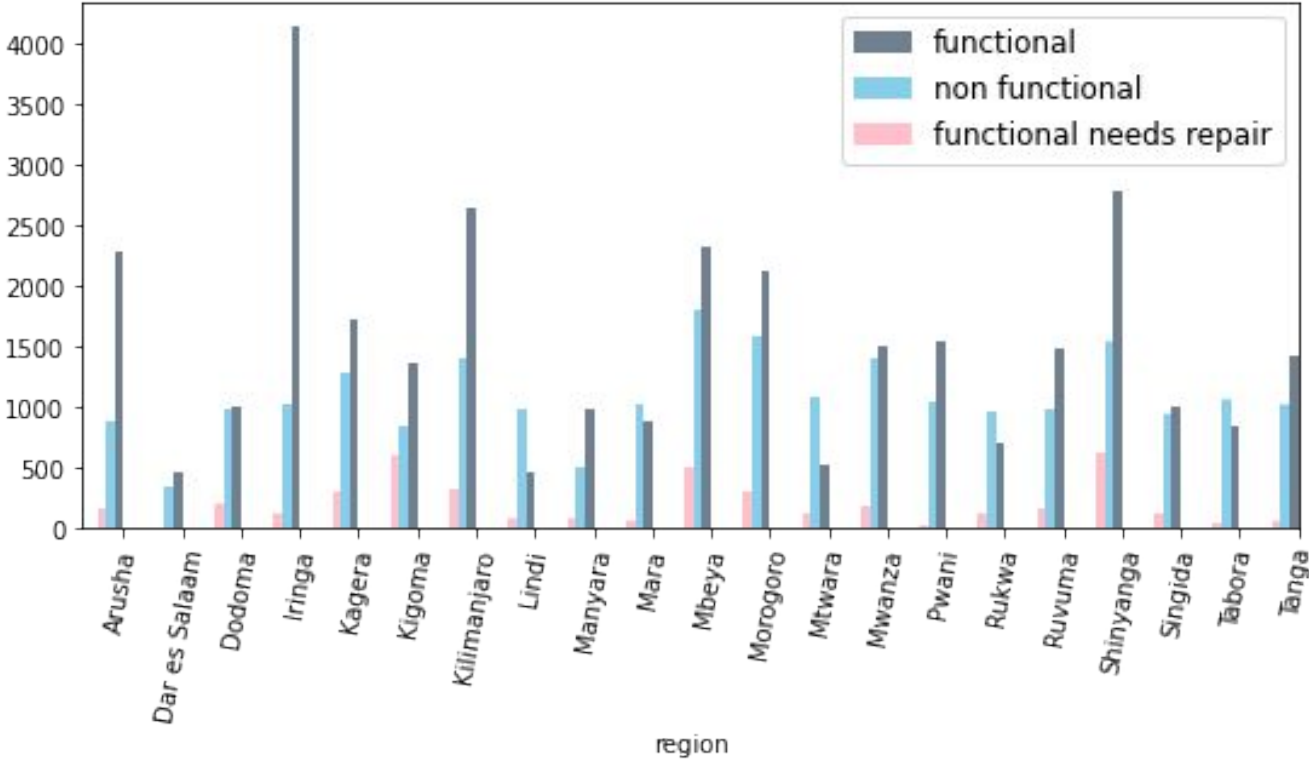# Operation: Payment vs Functionality

Operation: Management vs Functionality

Geospatial

Three map plots showing geographical distribution of functional groups.
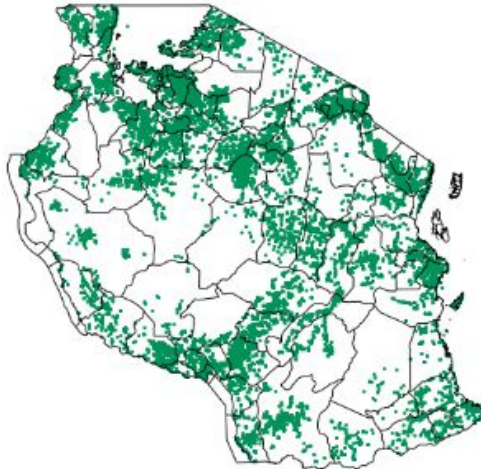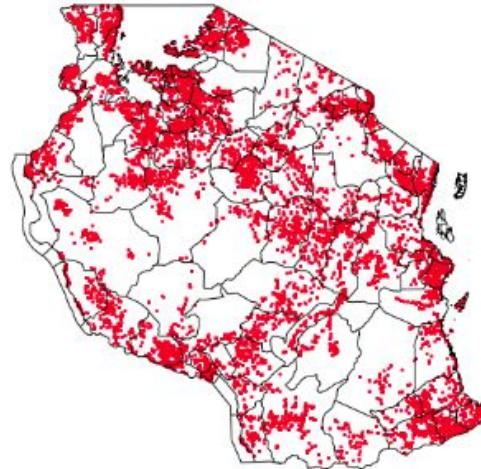
Geospatial

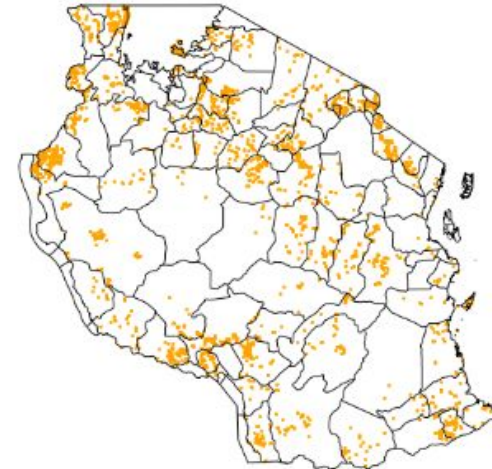Three map plots showing geographical distribution of functional groups.

Functional Pumps

Non Functional Pumps

Functional Pumps Need Repairs

Odd Regions Out!

What makes them different?

- **Source:** Machine DBH & Shallow Well on the top
- **Extraction:** Handpump & Other taking ahead
- **Population:** Higher average than overall (by 32%)
- **Amount water available:** Average is lower than overall average (by 28%)

Models

Random Forest Classifier

K-Nearest Neighbour
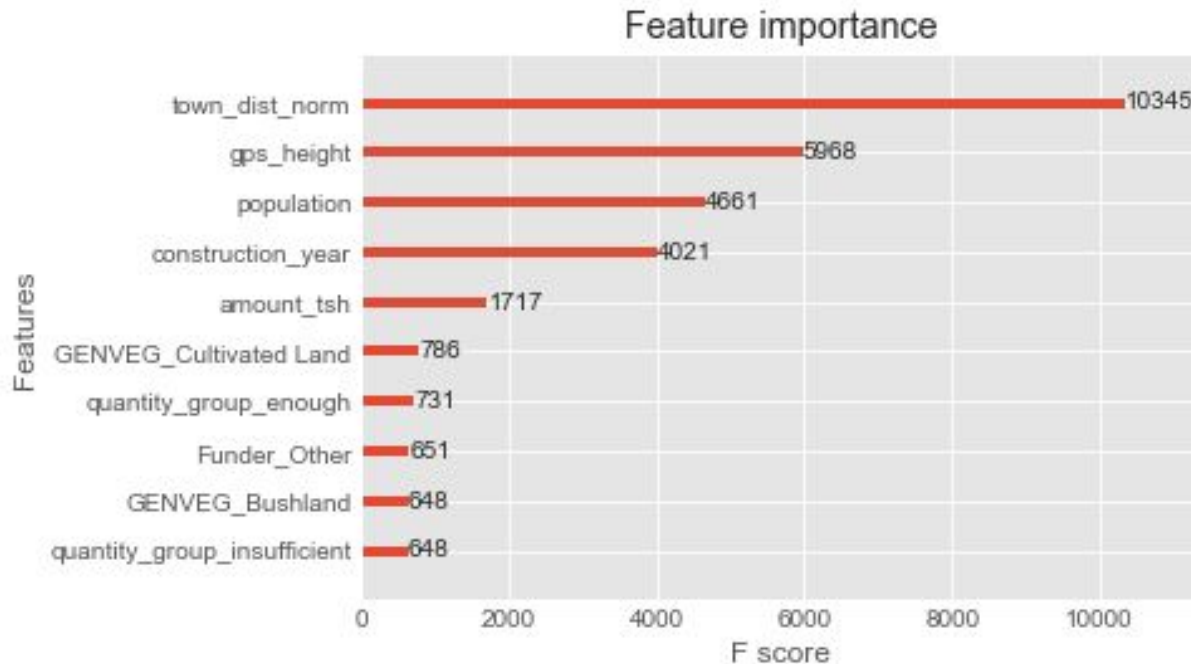
XGBoost

Model's Accuracy

KNN: 68%

RFC: 73%

XGBoost: 79%

What variables are important?

Feature importance

Features	F score
town_dist_norm	10345
gps_height	5968
population	4661
construction_year	4021
amount_tsh	1717
GENVEG_Cultivated Land	786
quantity_group_enough	731
Funder_Other	651
GENVEG_Bushland	648
quantity_group_insufficient	648

Further Improvement Area

1. Deeper dive into the management, funding, and installing agencies

2. Other economic factors to add into the study

3. Predict the unknown value in quality and quantity.

4. User group for the pumps: Education level & Water end use

Thank you.

Q&A?