

# Tanzania Water Well Classifier

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Predicting Water Well Functionality in Tanzania | *Emmanuel Rono*

# Overview



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## Introduction

**66 Million**

people live in Tanzania, which  
is the largest country in  
Eastern Africa

**26 Million**

of its inhabitants lack direct  
access to clean water

This situation has given rise to a hampered agricultural sector,  
severe health problems and high infant mortality rates,  
contributing to economic stagnation.

# Business Understanding

- Tanzania struggles with providing clean water for its population of over 66 million.
- There are several waterpoints already established in the country by the state, NGOs and individuals.
- Some of the waterpoints are Functional, others are functional but need repair, while the rest are non-functional.



# The Mr. Beast Effect

After successfully building 100 wells in Kenya, renowned philanthropist, Mr. Beast is partnering with the UN-Habitat for a new initiative in Tanzania. Through 'Beast Philanthropy,' he aims to address SDG 6 by providing clean water and sanitation to communities, contributing to sustainable development in the region.

# Problem Statement

- 'Beast Philanthropy' organisation acknowledges that a significant portion of the population still lacks safe water access.
- To address this, they want to know the distribution of wells in Tanzania and assess the functionality of water pumps in existing wells.



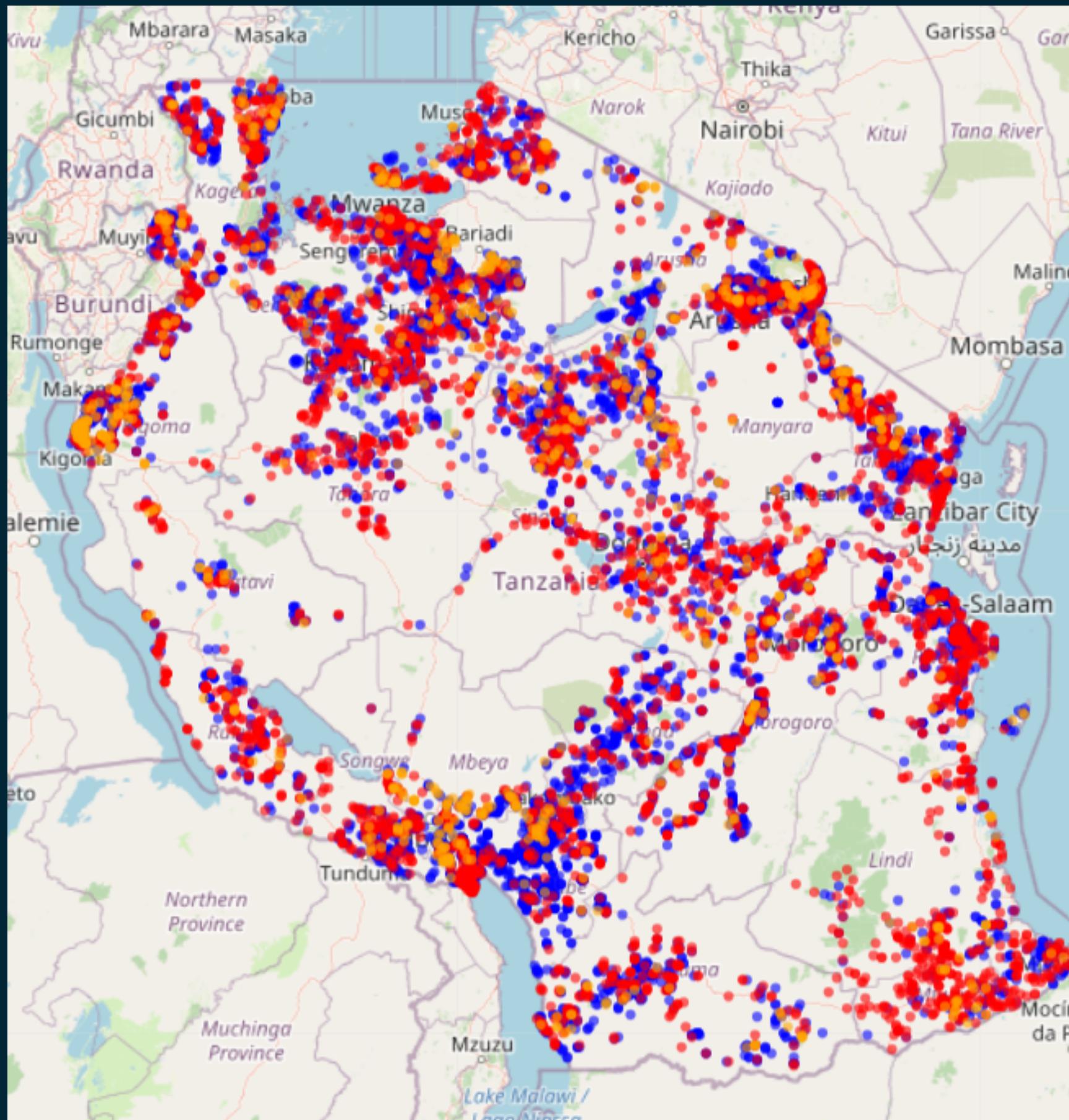
# Objectives

## Main Objective:

To deliver accurate predictions regarding the operational status of wells.

## Specific Objective:

- To determine what is the quality of Water in Tanzania
- To determine who are the top 5 Installers of water wells in Tanzania
- To determine the functionality status with respect to payment type
- To determine the condition of a waterpoint pump based on age
- To identify which installer results in the most nonfunctional waterpoint pumps
- To identify the most popular extraction type



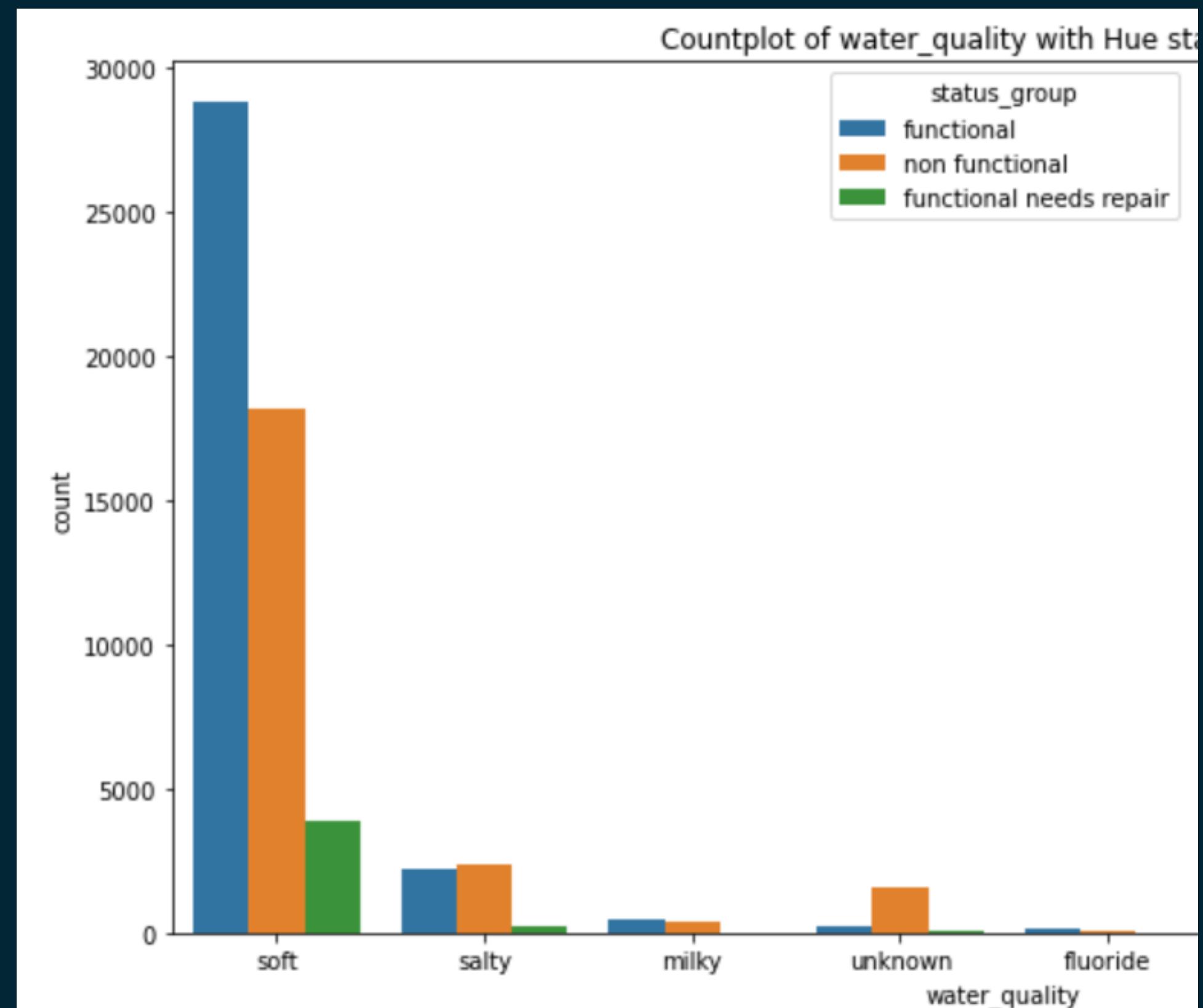
# Insights

There are over 59,000 wells distributed throughout Tanzania

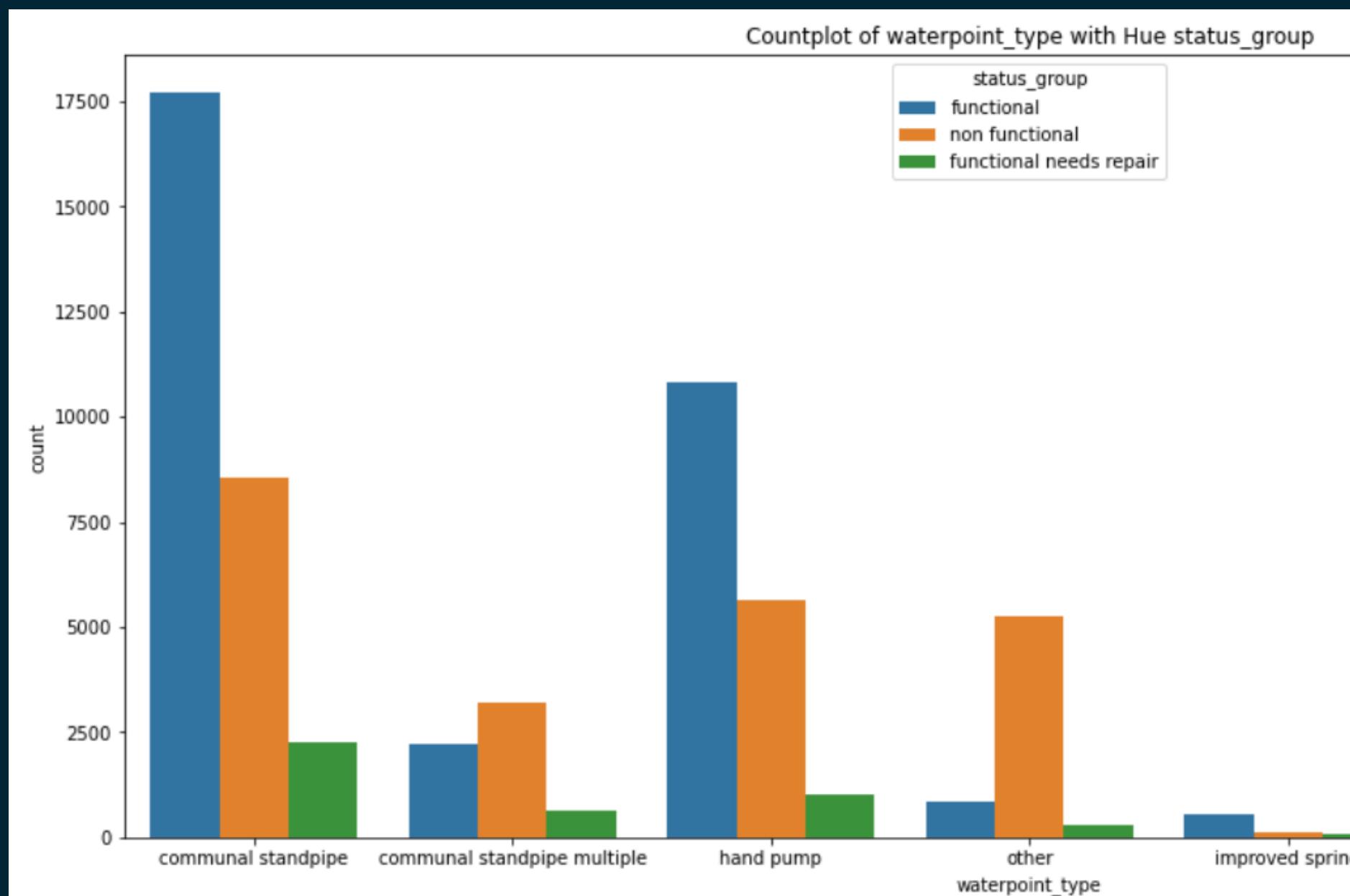
- Functional
- Non-functional
- Functional needs repair

# Water Quality

- About 50,000 wells produce clean water
- Of that, about 18,000 are non functional
- About 4000 clean water wells are functional but need repair

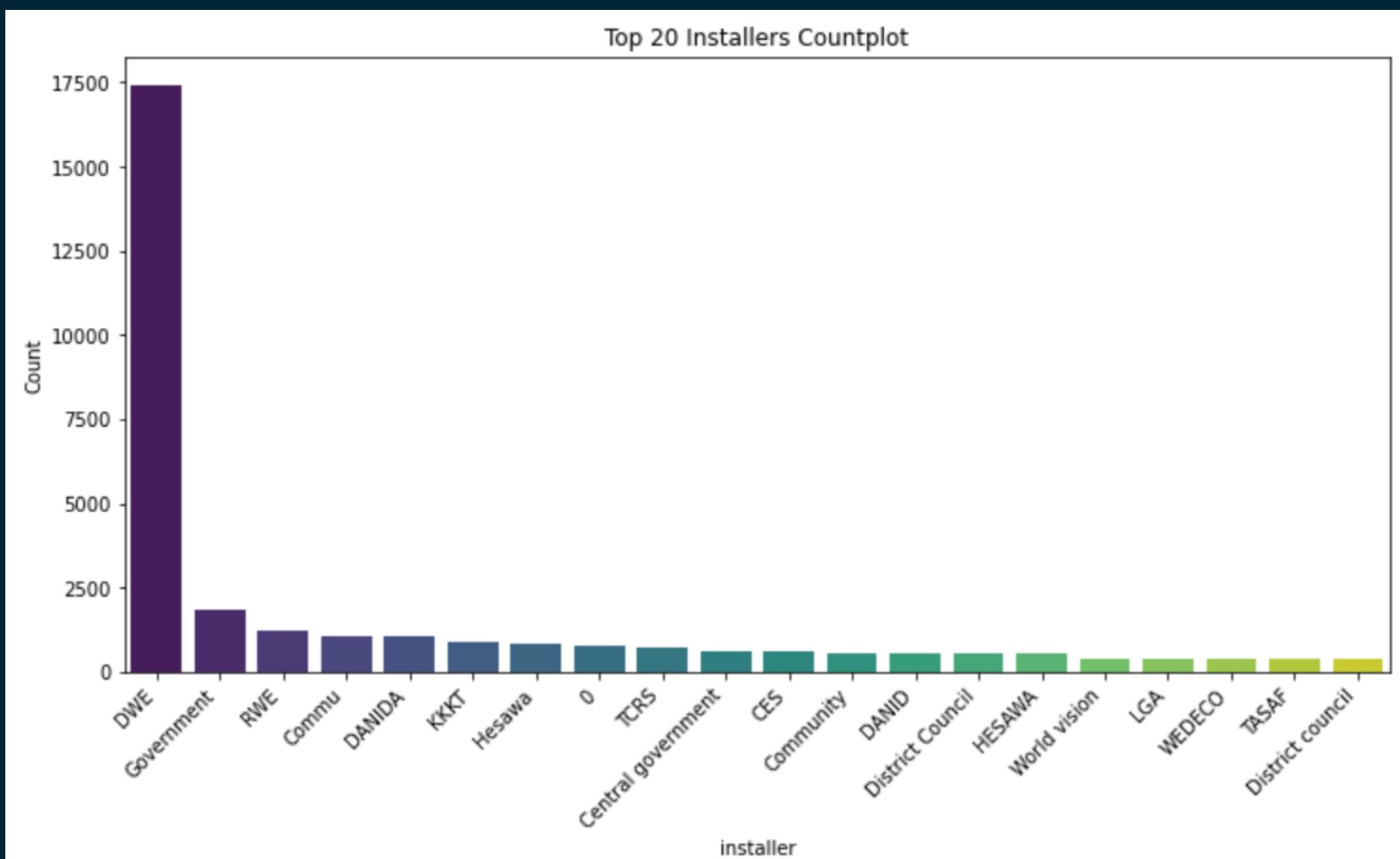


# Waterpoint Type



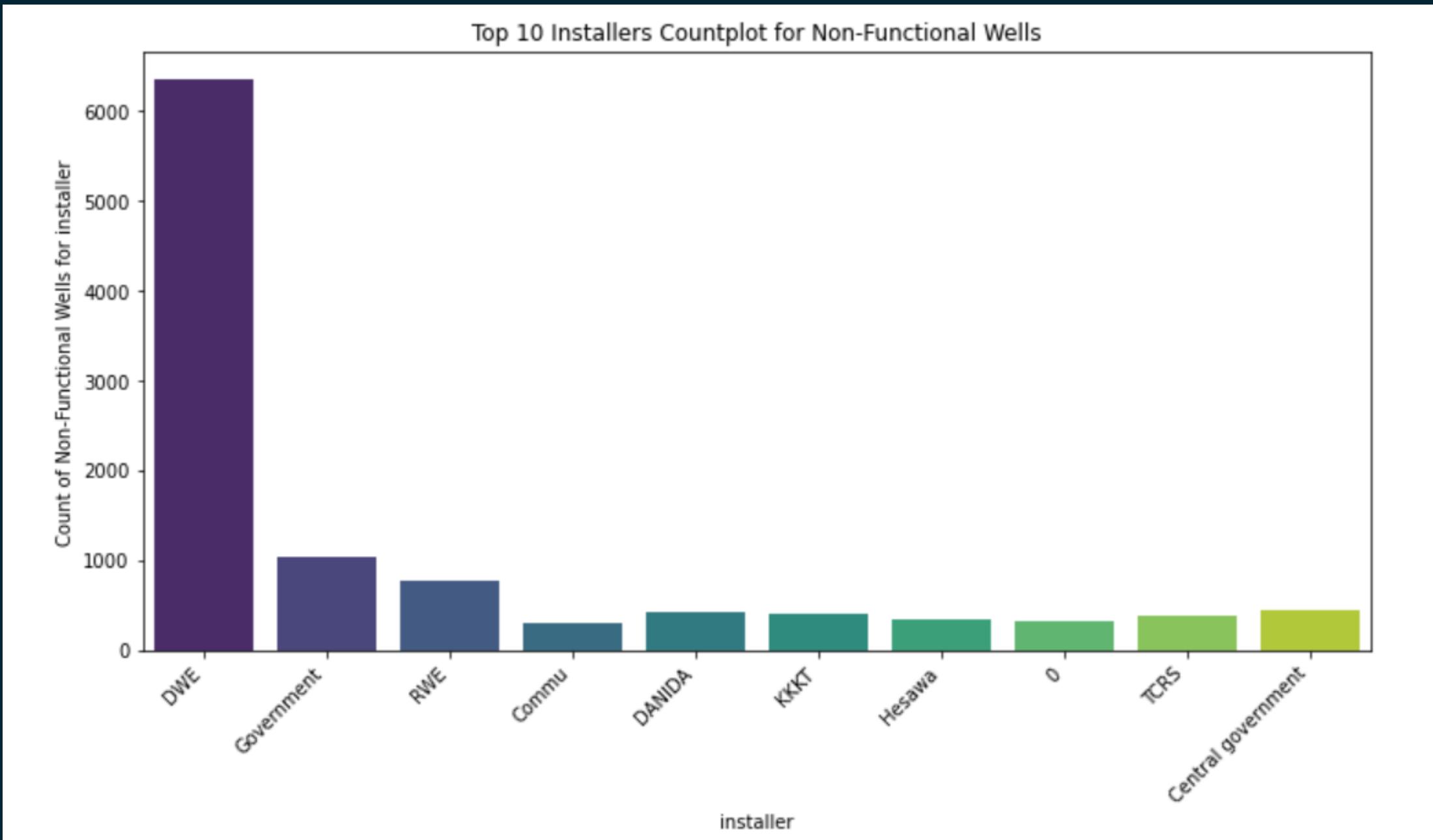
- Communal standpipe is the most popular water point type.
- The Hand pump waterpoint is also quite popular.

# Top Installers



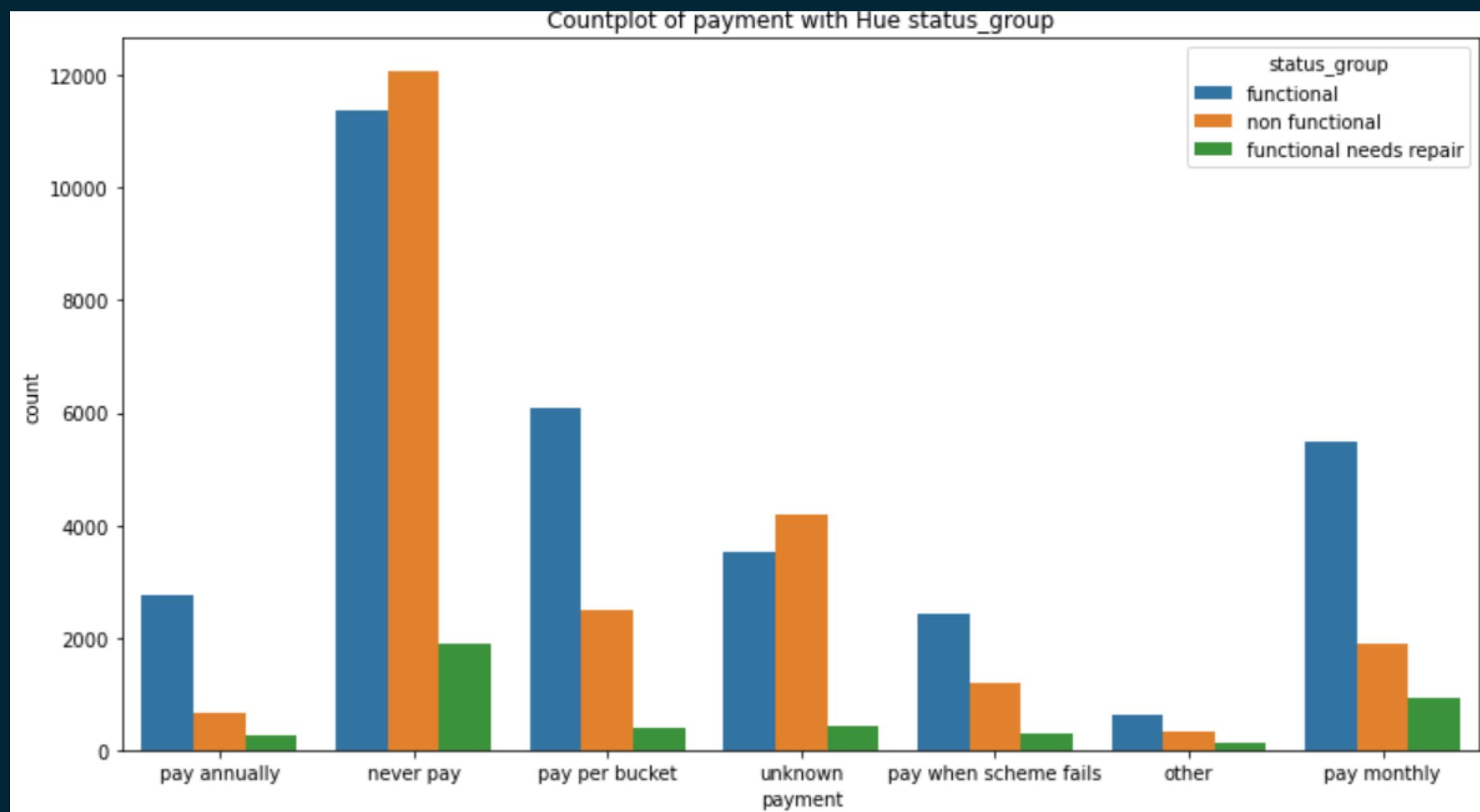
- The leading installer is the District water Engineer(DWE)
- The government is the 2nd most popular installer

# Installers with leading number of non-functional wells



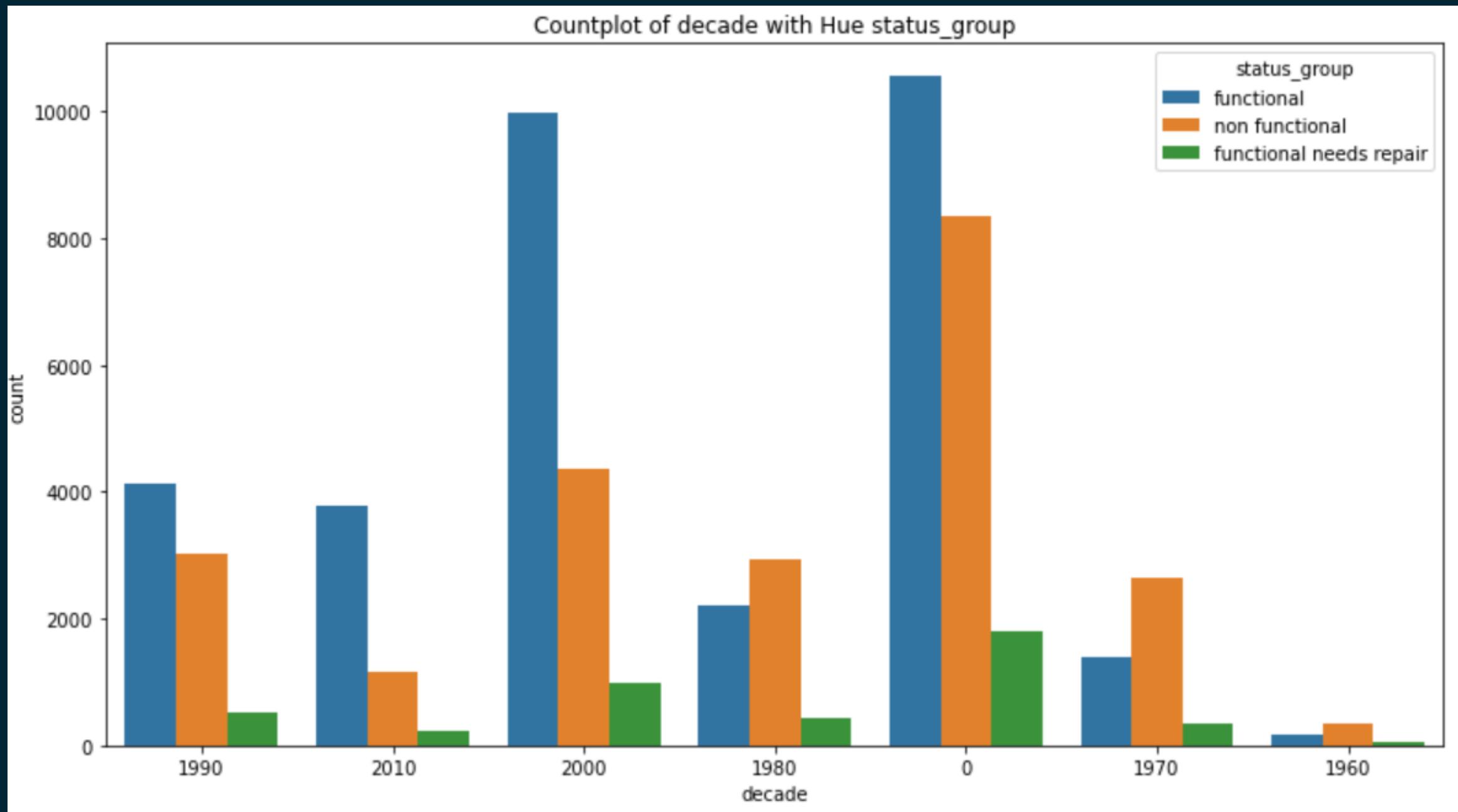
- Here, we also see that the leading installer is the District water Engineer(DWE)
- The government is the 2nd most popular installer with the most number of non-functional wells

# Payment type influence



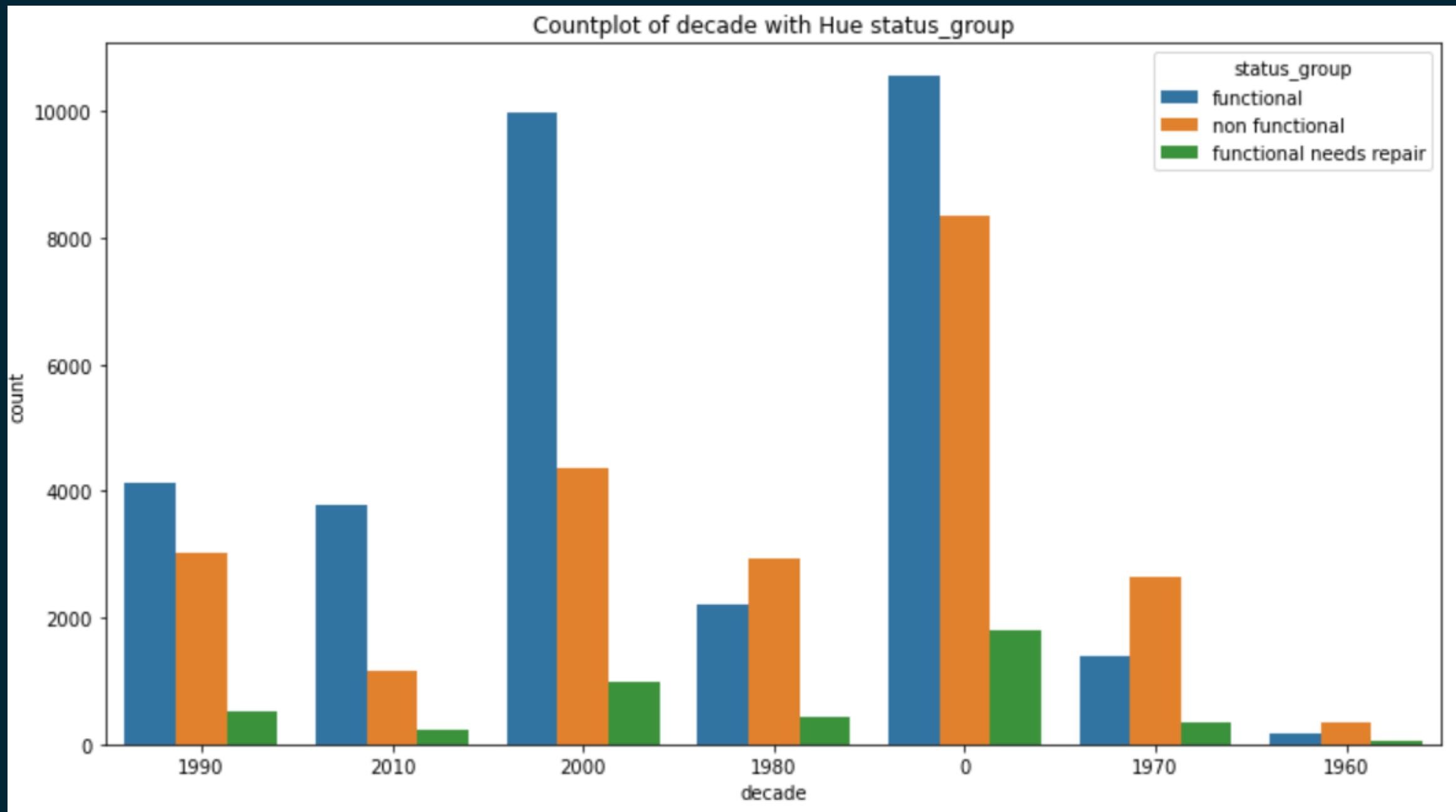
- Where payment is made, there is a higher count of functional wells to non-functional
- This suggests that there is a relationship between payment and the functionality of wells.
- It could be that payment is associated with better maintenance or higher-quality wells, leading to increased functionality.

# Water pumps Age



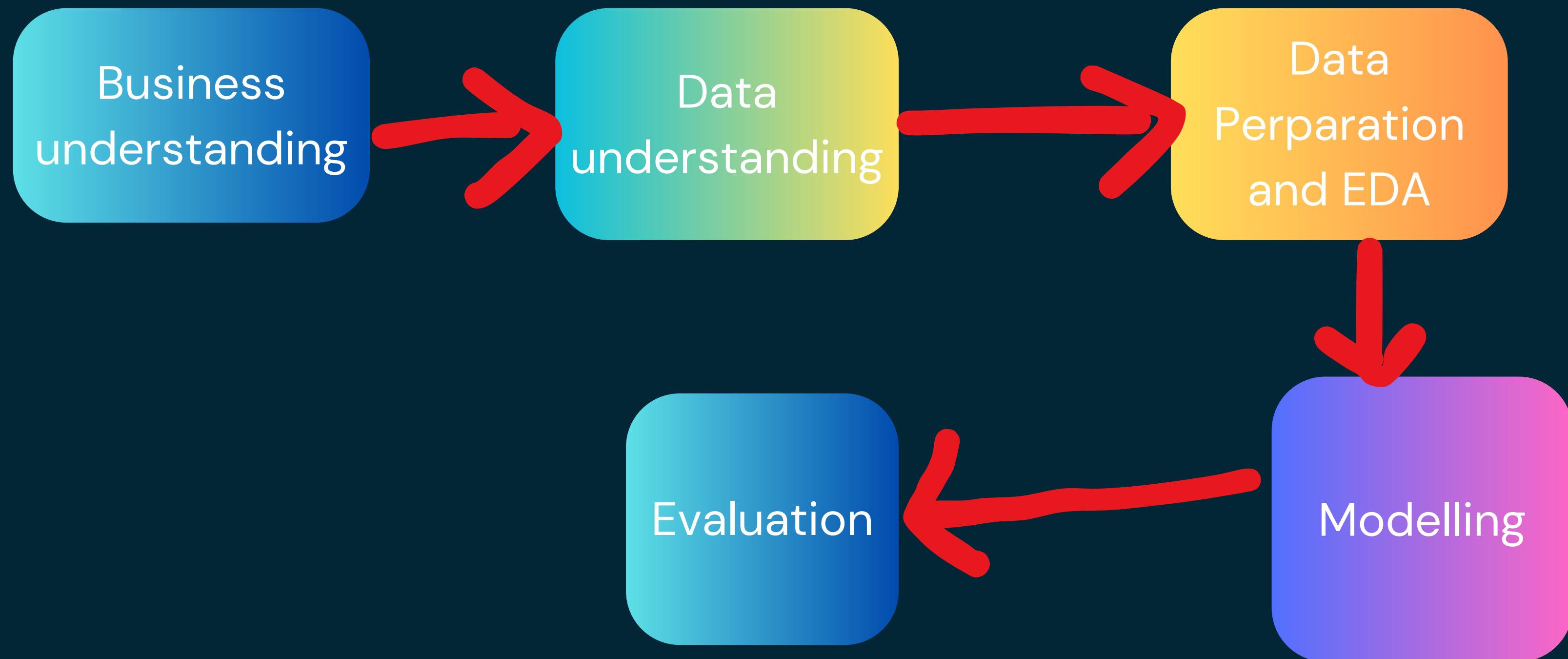
- Most functional wells were built in the new millennium
- Older wells have a higher chance of being non-functional.

# Extraction types



- Gravity is the most preferred extraction type.
- The hand pump is also quite popular.

# Methodology



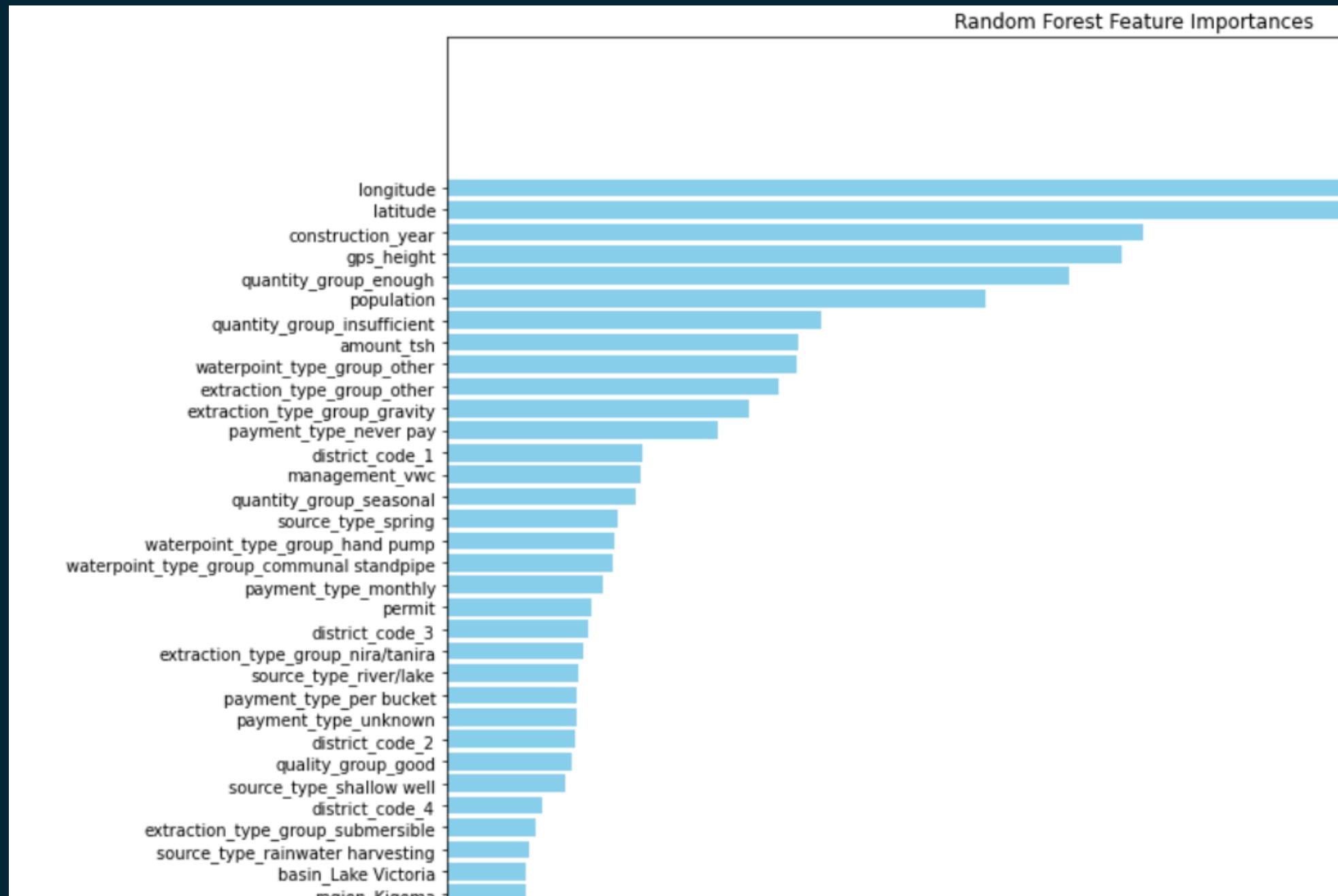
# Results



The Model is  
**82%**  
Accurate

XGB Classifier was our best predictor.

# Conclusion



The geographical positioning, construction year and population, greatly influence the status of a water well.

# Recommendations

- The ‘Beast Philanthropy’ org. should utilize the predictive model to develop a strategy for prioritizing waterpoints according to needs.
- By creating a more effective maintenance program, the organisation can reduce costs and allocate those savings towards expanding the water infrastructure.
- Additionally, the accuracy of the model can be used to showcase the organisation’s progress and attract international aid, other philanthropists, or even the government.



# Next Steps



- To improve the model, maintenance records should be integrated to reflect repairs made to the waterpoints, to prevent the same waterpoints from being classified as needing repairs year after year.
- Additional classifiers can be used to determine which non-functional waterpoints to prioritize for maintenance



Thank you for  
Listening