PROPOSAL FOR THE WATER SITUATION IN TANZANIA

VICTORIA INC. LTD

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Introduction

- Tanzania, a developing nation, faces challenges in supplying its more than 57,000,000 inhabitants with water that is safe for drinking.
- According to the Sustainable Development Goals (SDG) standards, just 61% of Tanzanian households presently have access to a basic water supply, 32% to basic sanitation, and 48% to basic hygiene.
- Tanzanians rely heavily on groundwater as their primary supply of water.
- The project aims to builds classification model, using an iterative approach, to predict the condition of water wells in Tanzania.

Business Understanding

- Victoria Inc. has been procured by the Government of Tanzania on a consultancy basis to study the severe water crisis experienced by the country and propose a data driven solution to clean water accessibility. Victoria Inc. is tasked with coming up with a model that predicts the operating condition of the water points. This model will assist the government to:
  - Prioritize maintenance and repairs based on operating status;
  - Understand the failure rate of the water points;
  - Optimize allocation of resources to restore the water points.

Problem Statement, Metric of Success & Methodology

Problem Statement

Predicting the operating condition of water points and advising the government on the critical points to be addressed.

Metrics of Success

Developing of a Machine Learning model with an accuracy score of 80%:

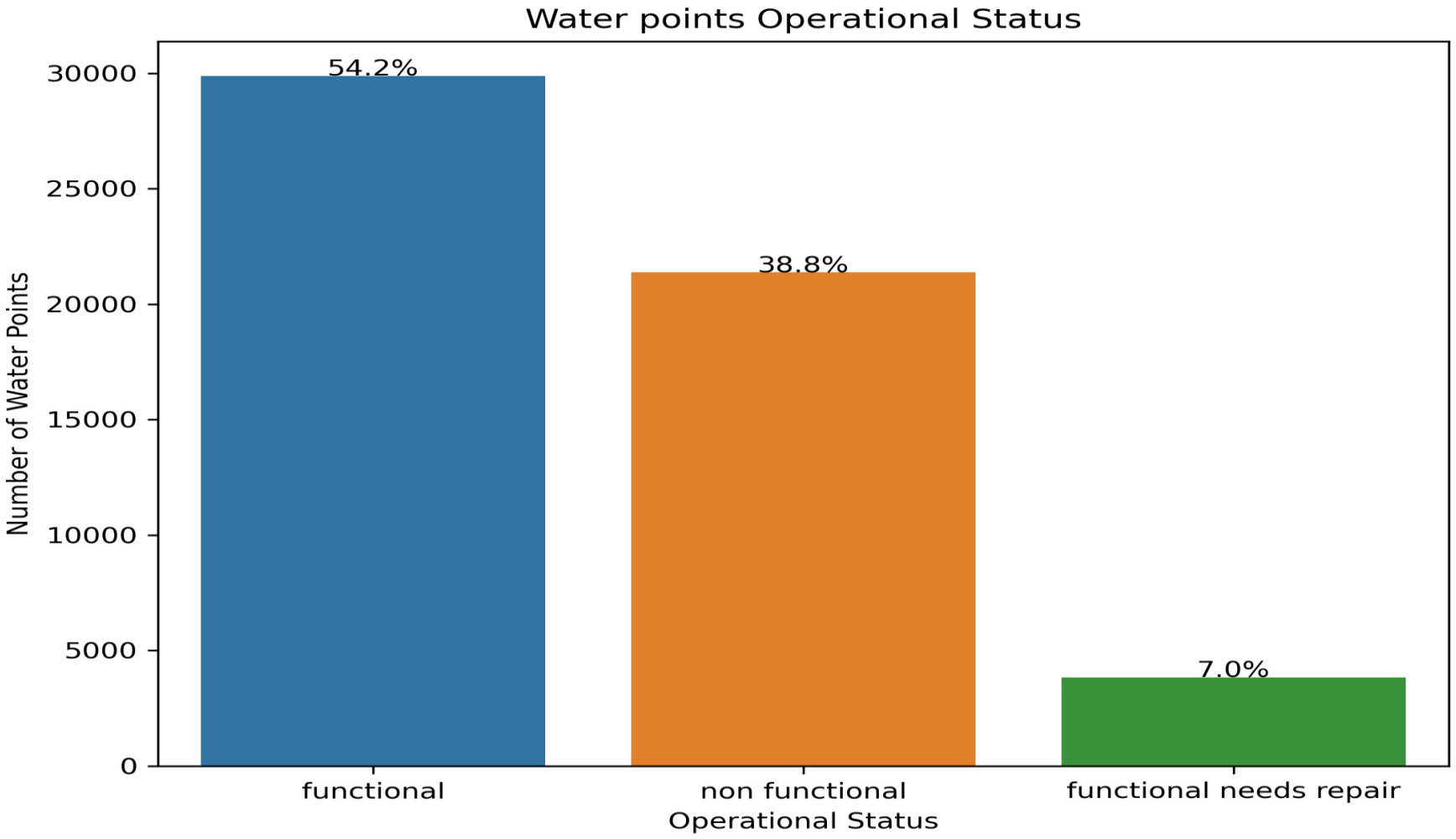
a) Methodology

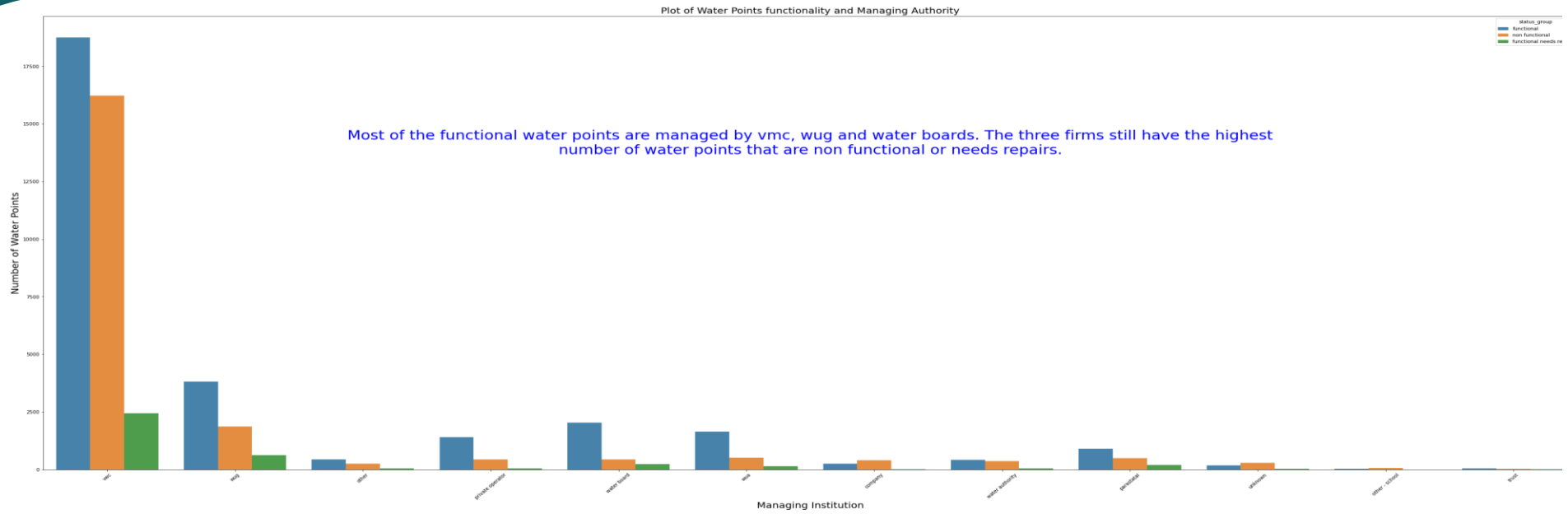
The five phases of CRISP – DM:

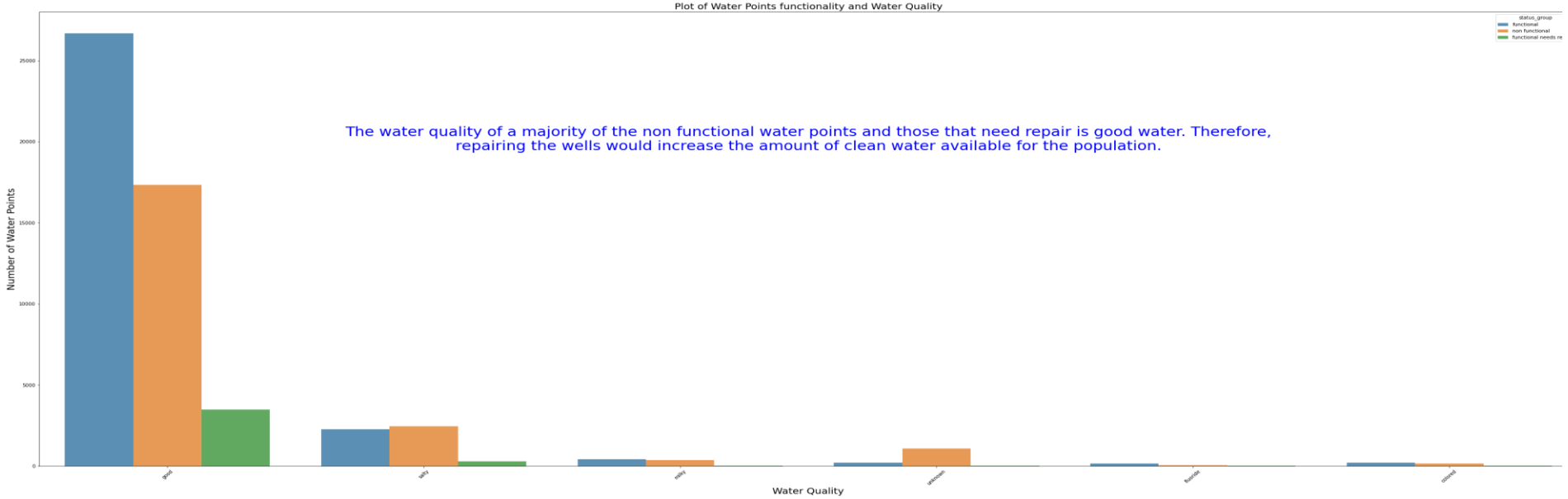
i. Domain knowledge (Business Understanding),
ii. Data Understanding
iii. Data Preparation.
iv. Explanatory Data Analysis
v. Modelling

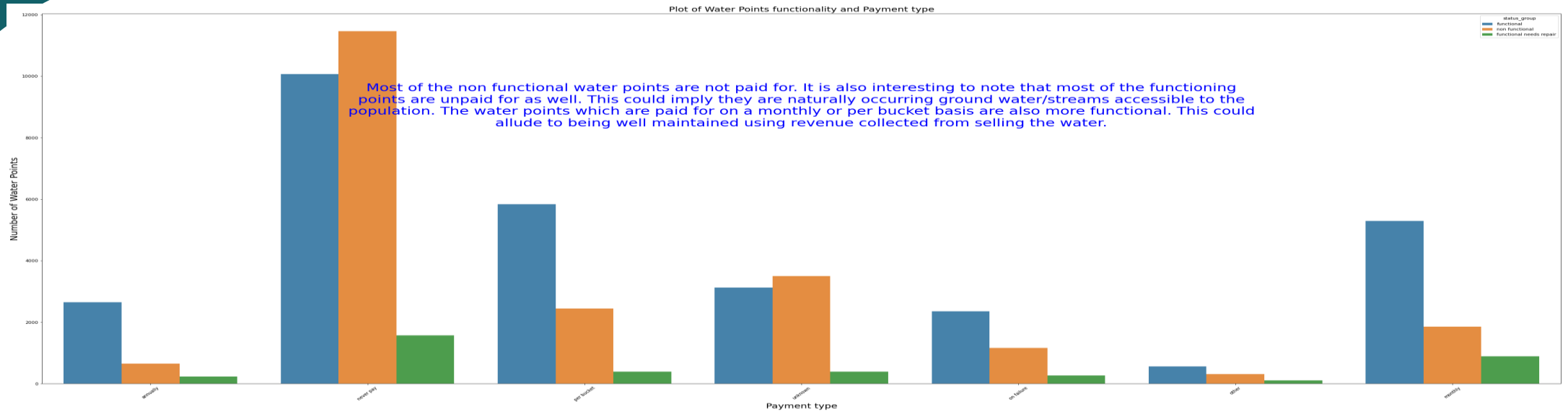
Analysis and Findings

Summary Statistics

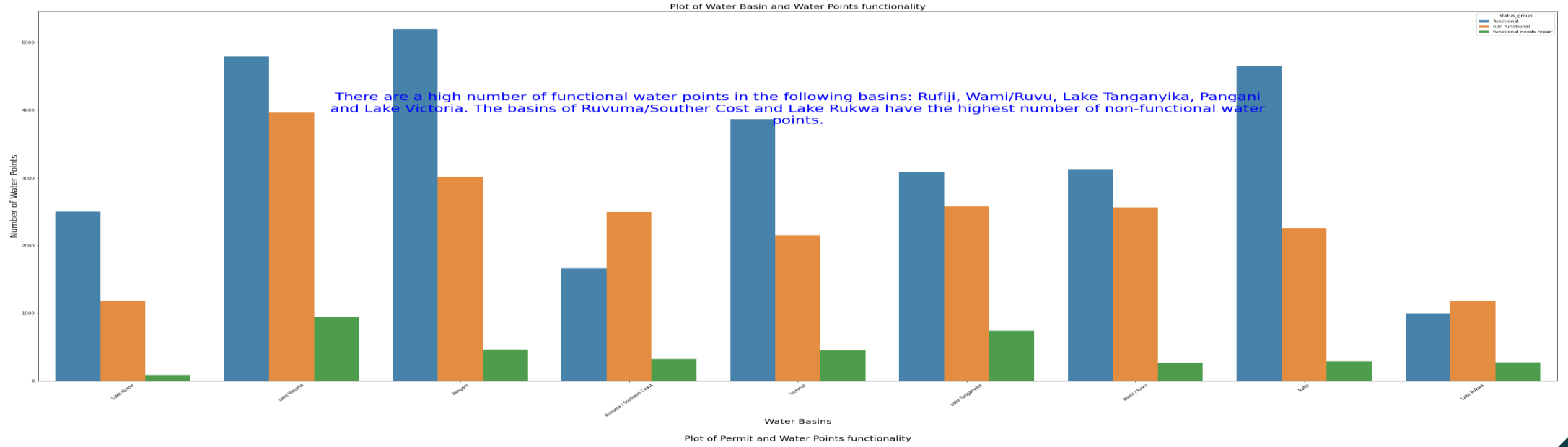



Plot of Water Points functionality and Managing Authority
Most of the functional water points are managed by vmc, wug and water boards. The three firms still have the highest number of water points that are non functional or needs repairs.
Number of Water Points
Managing Institution
status_group
functional
non functional


Plot of Water Points functionality and Water Quality
The water quality of a majority of the non functional water points and those that need repair is good water. Therefore, repairing the wells would increase the amount of clean water available for the population.
Number of Water Points
Water Quality
status_group
functional
non functional



Most of the non functional water points are not paid for. It is also interesting to note that most of the functioning points are unpaid for as well. This could imply they are naturally occurring ground water/streams accessible to the population. The water points which are paid for on a monthly or per bucket basis are also more functional. This could allude to being well maintained using revenue collected from selling the water.



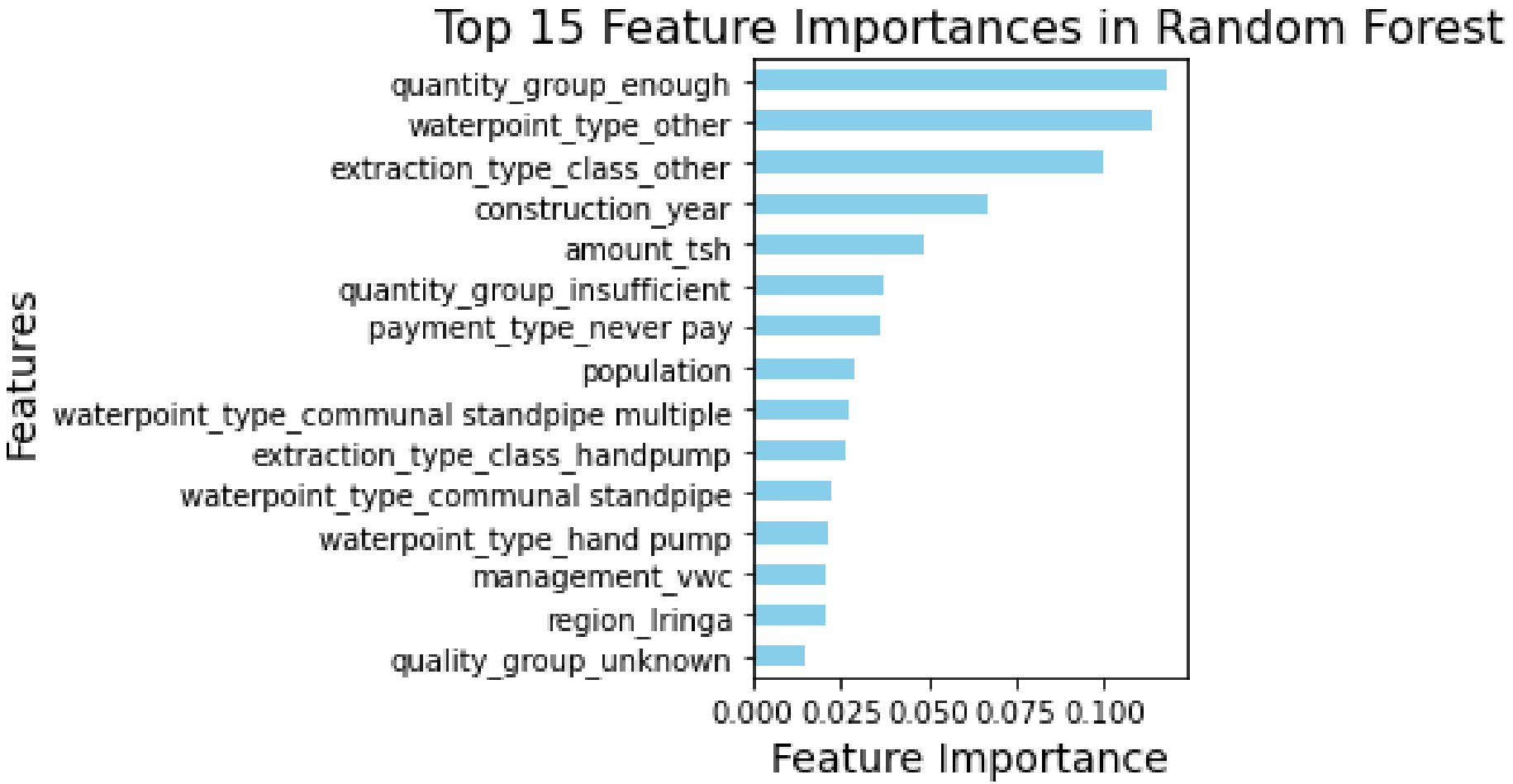
There are a high number of functional water points in the following basins: Rufiji, Wami/Ruvu, Lake Tanganyika, Pangani and Lake Victoria. The basins of Ruvuma/Souther Cost and Lake Rukwa have the highest number of non-functional water points.

Plot of Permit and Water Points functionality

Analysis and findings

- The main source of water for Tanzania is ground water.
- Payment provides incentive and means to keep wells functional. Wells with no fees are more likely to be non functional.
- The most important features are quantity of water (enough), water point type and extraction type for the waterpoint. There are over 8,000 waterpoints that have enough water in them but are non functional. These are recommended as high priority class to repairs.

Important Features for Water Point Performance



Recommendations

i. The Tanzanian government should allocate more resource for repair of non functional water pumps to the following regions Mbeya, Lindi, Rukwa, Tabora and Mara. The regions have a higher number of non function pumps water points as the situation is critical.

ii. The functional but need repairs water points in Lake Victoria, Southern Coast, Lake Rukwa, Pangani and Lake Tanganyika basins should be addressed to prevent failure which can be more expensive to repair.

iii. Repairs and Maintenance for the over 8,000 waterpoints that have enough water in them but are non functional should be prioritized.

iv. VMC, WUG and Water Board have a lower rate of pump failure. This alludes to their good water points management strategies. It is therefore recommended that the other companies benchmark with the three firms.

Thank you