Improving Access to Clean Water in Tanzania

Tanzania, a developing country, faces the challenge of providing clean water to over 57 million people. This presentation will explore the critical factors affecting water well functionality, predict well status, and recommend strategies to enhance well management and maintenance for reliable access to safe drinking water.

Understanding the Water Well Landscape

1

Business Understanding

Tanzania is working to ensure reliable access to clean water by focusing on management practices, payment methods, and water quality for effective maintenance strategies.

2

Problem Statement

This project aims to identify critical factors affecting well functionality, predict well status, and recommend strategies for improving well management and maintenance.

Collecting and Preparing the Data

Data Sources

The data is from drivendata.org, featuring information about Tanzania's water wells, their status, and relevant factors.

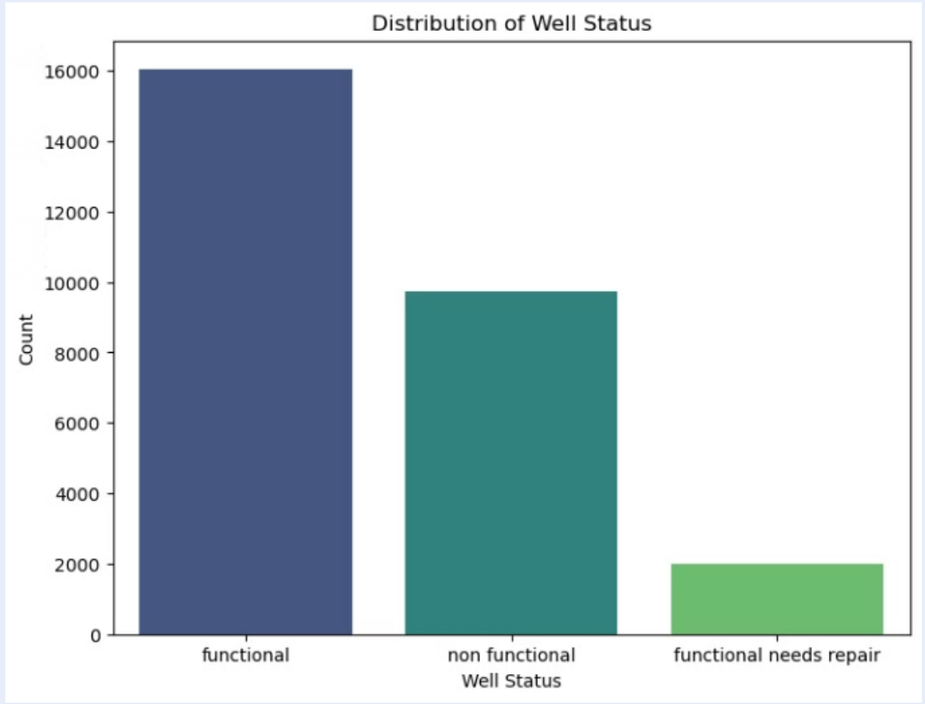
Data Preprocessing

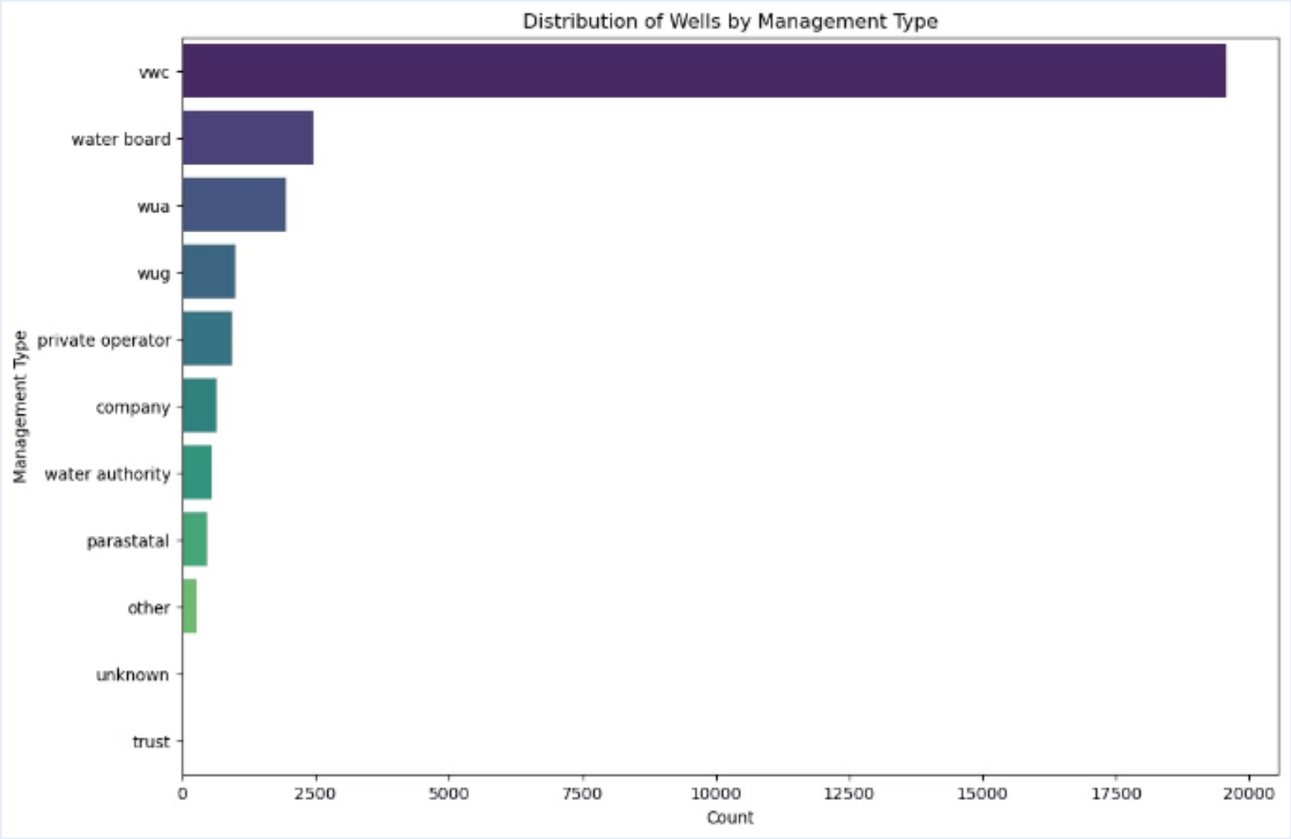
The two datasets were merged and prepared for comprehensive analysis to uncover insights and recommendations.

Exploratory Analysis

EDA was conducted in-depth exploratory data analysis to understand the key variables and their relationships.

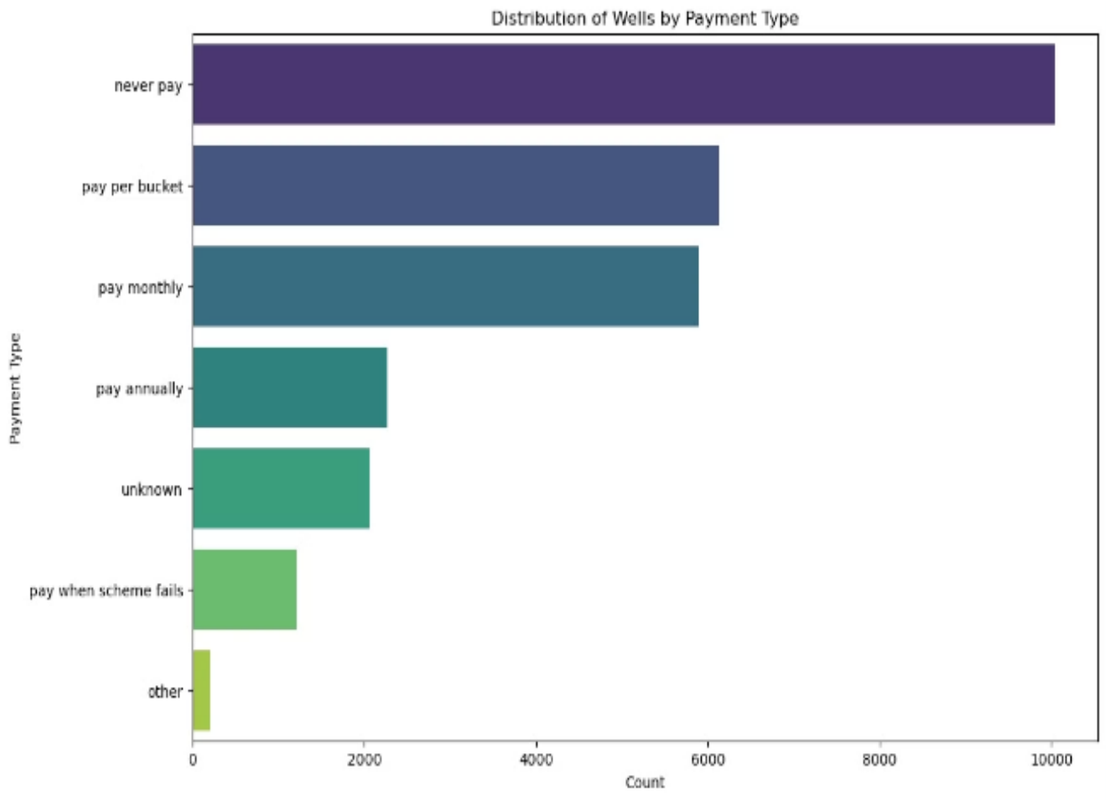
Visualizations Insights.



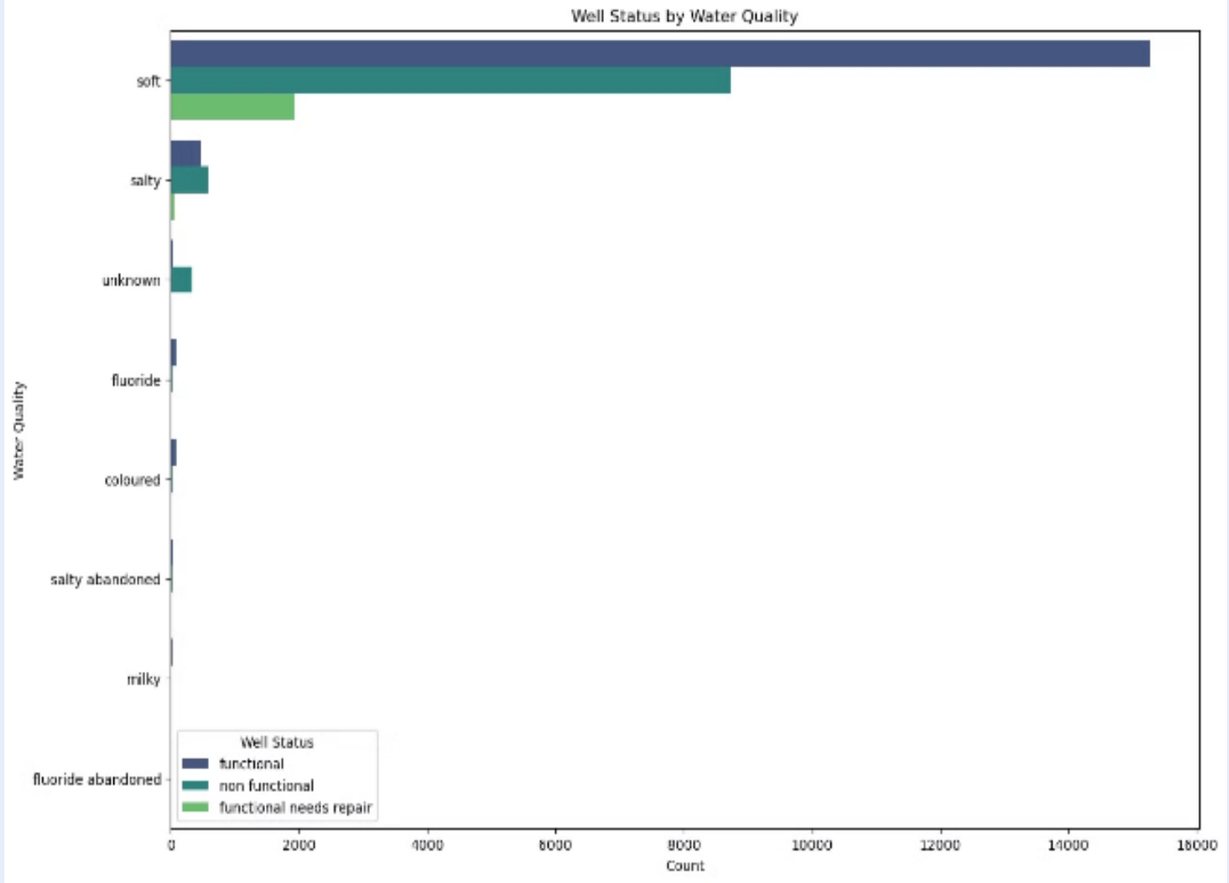


There are more functional wells compared to non-functional ones

Some management types are more prevalent, potentially impacting the functionality rates of the wells they oversee



Different payment types have varying distributions of functional and non-functional wells. For instance, wells where users pay annually or per bucket tend to be more functional.



The plot examines the correlation between water quality and well status, suggesting that wells with high-quality water may be more efficient, potentially impacting their functionality.

Uncovering Insights through Modeling

Modeling Approach.

Did a base model and later advanced techniques to predict well status and identify critical factors affecting functionality.

Modelling Findings

Based on the analysis, the Random Forest model outperforms the Decision Tree and XGBoost models in terms of accuracy, precision, recall, F1 score,Therefore, Random Forest is recommended for predicting the functionality of water wells in Tanzania.

1 2 3

Key Findings

- **Important Features:** Management practices, payment methods, and water quality are significant factors influencing well functionality.
- **Model Performance:** Random Forest model achieved the highest performance metrics, indicating its effectiveness in predicting well status.

RECOMENDATIONS.

Effective Management

Promote and support management practices that correlate with higher well functionality.

Sustainable Payment

Encourage payment methods that ensure funds for regular maintenance, potentially improving functionality rates.

Water Quality Focus

Invest in initiatives to enhance water quality, as it significantly impacts well functionality.

Targeted Interventions

Implement region-specific strategies to address local issues and improve well functionality across different areas.

Empowering Communities through Water Access

Health Benefits

Improved access to clean water promotes better health outcomes and reduces the risk of waterborne diseases.

Educational Impact

With reliable water access, children can attend school more regularly, improving educational opportunities.

Economic Empowerment

Sustainable water access supports agricultural activities and enables communities to thrive economically.

Community Resilience

Collaborative efforts to maintain and manage water wells foster a sense of community ownership and resilience.

Towards a Sustainable Water Future

1

Identify Factors

Analyze key factors affecting well functionality to inform targeted interventions.

2

Predict Well Status

Utilize predictive modeling to anticipate well performance and proactively address issues.

3

Recommend Strategies

Develop practical strategies to enhance well management, maintenance, and water quality for sustainable access.

Thank you.

This presentation has outlined the critical insights and recommendations from the Tanzania water wells analysis.