



Water Quality Analysis of the Thumbikulama Cascade

Healthy Landscapes Project

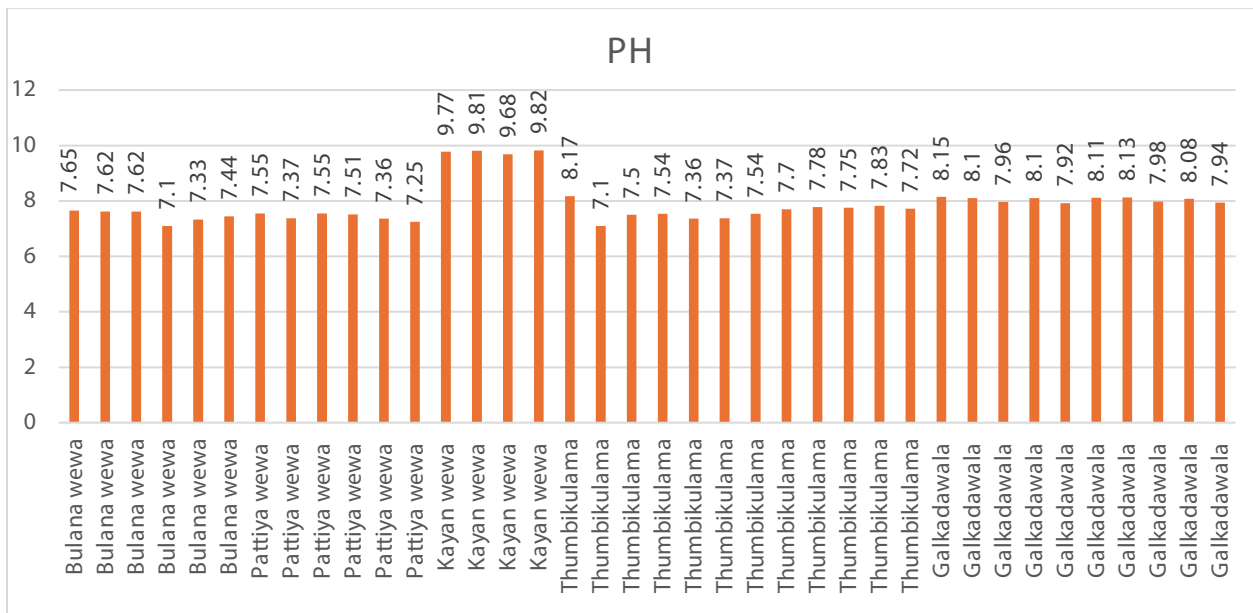
2024

The Water Quality testing of the Thumbikulama Cascade

The water samples were obtained by all the five tanks of the cascade along the tank bunt using Teflon bottles to avoid any interaction between the bottle surface and water. Two identical samples were collected from each location to separately analyze the anions and cations by treating conc. HNO_3 . The water samples were kept in cool environment using ice at the field and later they were refrigerated at the laboratory.

The testing were done at the laboratory using calibrated laboratory equipment.

PH



Summary of Data

The data presents the pH levels from different water tanks. The tanks included are:

- Bulana Wewa
- Pattiya Wewa
- Kayan Wewa
- Thumbikulama
- Galkadawala

Each tank has multiple pH readings, which provide insights into the acidity or alkalinity of the water in each location.

Descriptive Statistics

Here are the summary statistics for each tank:

1. **Bulana Wewa**
 - pH Range: 7.10 to 7.65
 - Average pH: ~7.29
2. **Pattiya Wewa**
 - pH Range: 7.25 to 7.55
 - Average pH: ~7.43
3. **Kayan Wewa**
 - pH Range: 9.68 to 9.82
 - Average pH: ~9.77
4. **Thumbikulama**
 - pH Range: 7.10 to 8.17
 - Average pH: ~7.57
5. **Galkadawala**
 - pH Range: 7.92 to 8.15
 - Average pH: ~8.05

Interpretation

- **Bulana Wewa** and **Pattiya Wewa** have pH values that are slightly alkaline, with readings consistently around 7.1 to 7.65. This suggests that the water in these tanks is close to neutral but on the alkaline side.
- **Kayan Wewa** has significantly higher pH values (9.68 to 9.82), indicating highly alkaline water. This could suggest different geological or biological conditions in this tank compared to the others.

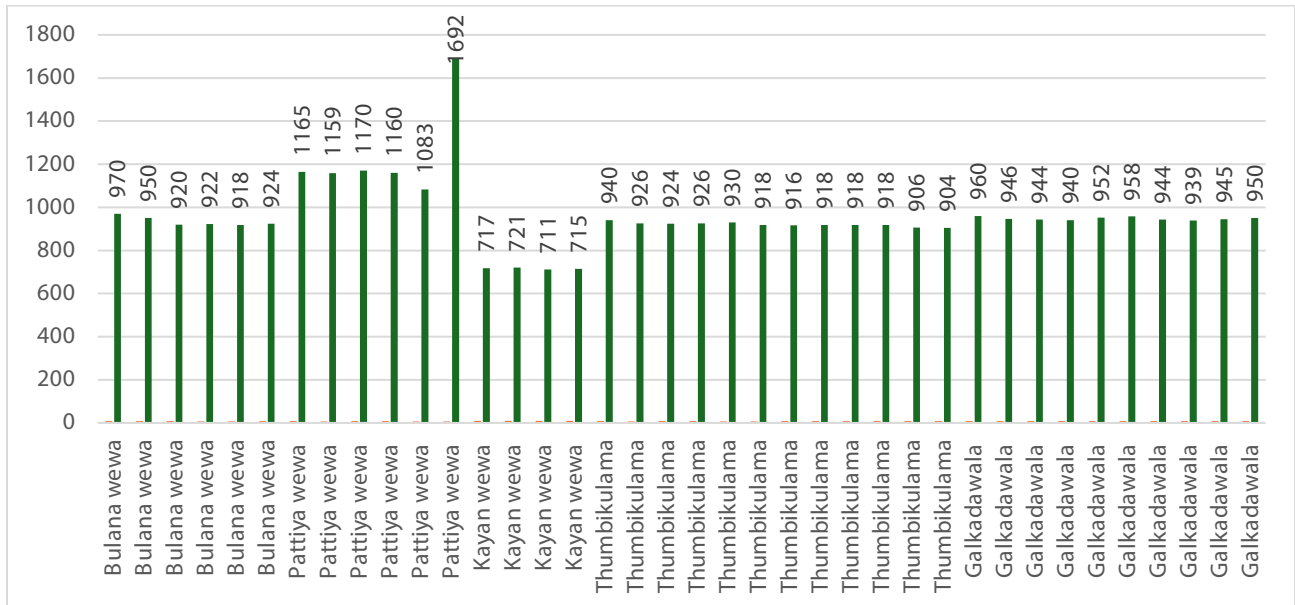
- **Thumbikulama** has a wider range of pH values (7.1 to 8.17), indicating more variability in water conditions. The presence of readings around 7.1 suggests some points are close to neutral, while others are quite alkaline.
- **Galkadawala** has moderately alkaline water, with pH values ranging from 7.92 to 8.15. The readings are consistent, indicating stable water conditions.

Conclusion

- The pH levels in **Bulana Wewa** and **Pattiya Wewa** are relatively stable and mildly alkaline.
- **Kayan Wewa** stands out with very high alkaline levels, which may require further investigation to understand the cause.
- **Thumbikulama** shows a range of pH levels, indicating variability that could be due to environmental or seasonal changes.
- **Galkadawala** has consistent pH levels, moderately alkaline.

This analysis helps in understanding the water quality across different tanks, indicating that while most tanks have stable pH levels, Kayan Wewa requires attention due to its high alkalinity. Regular monitoring and potential corrective measures may be needed to manage the water quality effectively

Electrical conductivity



Summary of Data

The data presents the Electrical Conductivity (EC) levels from different water tanks. Electrical Conductivity is a measure of the water's ability to conduct electricity, which is influenced by the concentration of ions in the water. The tanks included are:

- Bulana Wewa
- Pattiya Wewa
- Kayan Wewa
- Thumbikulama
- Galkadawala

Each tank has multiple EC readings, which provide insights into the ion concentration of the water in each location.

Descriptive Statistics

Here are the summary statistics for each tank:

1. Bulana Wewa

- EC Range: 918 to 970 $\mu\text{S}/\text{cm}$
 - Average EC: $\sim 934 \mu\text{S}/\text{cm}$
2. **Pattiya Wewa**
- EC Range: 1083 to 1692 $\mu\text{S}/\text{cm}$
 - Average EC: $\sim 1249 \mu\text{S}/\text{cm}$
3. **Kayan Wewa**
- EC Range: 711 to 721 $\mu\text{S}/\text{cm}$
 - Average EC: $\sim 716 \mu\text{S}/\text{cm}$
4. **Thumbikulama**
- EC Range: 904 to 940 $\mu\text{S}/\text{cm}$
 - Average EC: $\sim 921 \mu\text{S}/\text{cm}$
5. **Galkadawala**
- EC Range: 939 to 960 $\mu\text{S}/\text{cm}$
 - Average EC: $\sim 947 \mu\text{S}/\text{cm}$

Interpretation

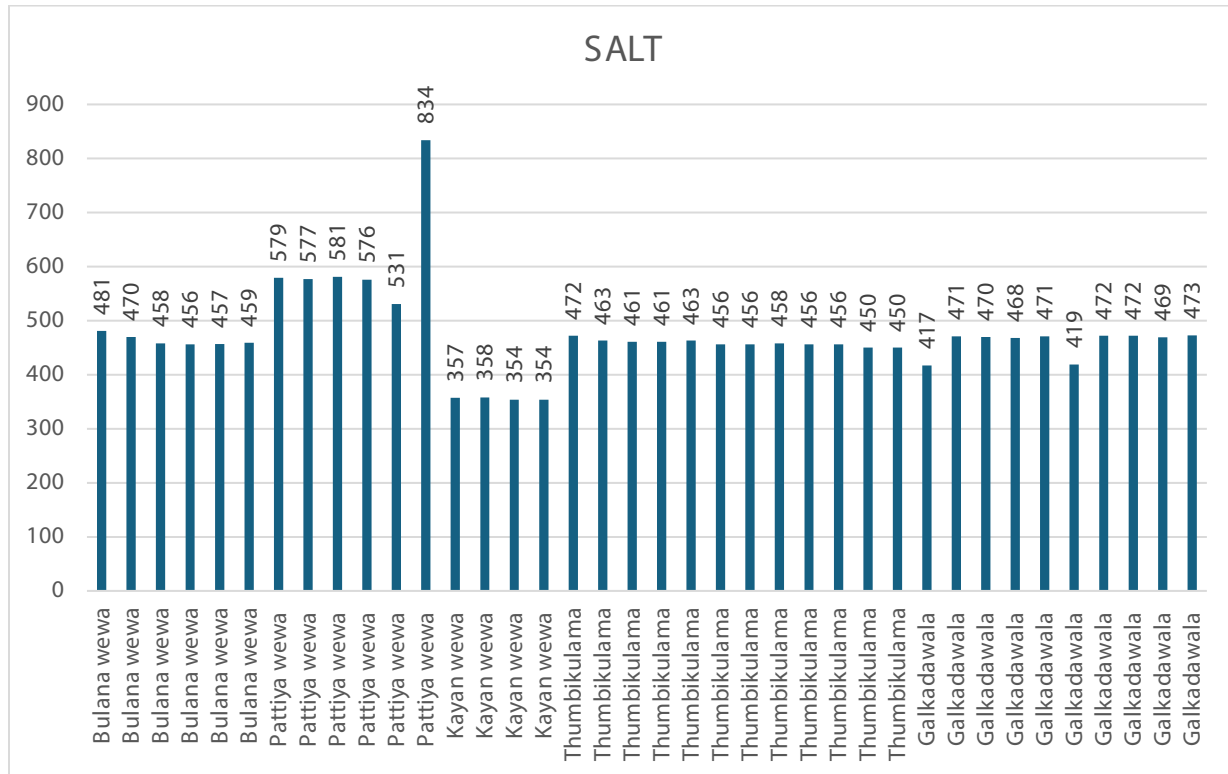
- **Bulana Wewa** has EC values ranging from 918 to 970 $\mu\text{S}/\text{cm}$, suggesting a relatively stable ion concentration.
- **Pattiya Wewa** shows a much wider range of EC values (1083 to 1692 $\mu\text{S}/\text{cm}$), indicating variability in ion concentration, with one particularly high reading (1692 $\mu\text{S}/\text{cm}$) that suggests a significant increase in ions.
- **Kayan Wewa** has the lowest EC values among all tanks, ranging from 711 to 721 $\mu\text{S}/\text{cm}$, indicating lower ion concentration.
- **Thumbikulama** displays a moderate range of EC values (904 to 940 $\mu\text{S}/\text{cm}$), with relatively consistent readings.
- **Galkadawala** also shows a moderate range of EC values (939 to 960 $\mu\text{S}/\text{cm}$), with stable readings.

Conclusion

- The **Bulana Wewa** and **Galkadawala** tanks have stable and moderate ion concentrations, indicated by their consistent EC values.
- **Pattiya Wewa** has higher and more variable ion concentrations, with one outlier (1692 $\mu\text{S}/\text{cm}$) that should be further investigated to understand the cause of the spike.
- **Kayan Wewa** has the lowest ion concentration, as evidenced by its consistently low EC values.
- **Thumbikulama** exhibits moderate ion concentrations, with readings that are consistent and fall within a narrow range.

Overall, the water quality in terms of ion concentration is relatively stable in most tanks, with **Pattiya Wewa** being an exception due to its higher variability and particularly high EC reading. Regular monitoring and potential corrective measures may be necessary for **Pattiya Wewa** to manage its water quality effectively

Salt Percentage of Water



Summary

The dataset provides measurements of salt content (in mg/L) from five different tanks:

- Bulana Wewa
- Pattiya Wewa
- Kayan Wewa
- Thumbikulama
- Galkadawala

The following conclusions can be drawn from the salt content data:

1. Bulana Wewa:

- **Salt Content Range:** 456 to 481 mg/L
- **Average Salt Content:** 463.5 mg/L

Bulana Wewa shows moderate salt content with values ranging between 456 and 481 mg/L. The variations are relatively small, indicating a stable salt concentration in this tank.

2. Pattiya Wewa:

- **Salt Content Range:** 531 to 834 mg/L
- **Average Salt Content:** 612.67 mg/L

Pattiya Wewa has the highest variation in salt content, ranging from 531 to 834 mg/L. This suggests significant variability, which could be due to factors such as varying degrees of evaporation, inflow of different water sources, or localized contamination.

3. Kayan Wewa:

- **Salt Content Range:** 354 to 358 mg/L
- **Average Salt Content:** 355.75 mg/L

Kayan Wewa exhibits the lowest salt content among the tanks, with values consistently around 354 to 358 mg/L. This indicates a low and stable salt concentration.

4. Thumbikulama:

- **Salt Content Range:** 450 to 472 mg/L
- **Average Salt Content:** 459 mg/L

Thumbikulama shows moderate salt content, similar to Bulana Wewa, with values ranging between 450 and 472 mg/L. The small range indicates stable salt concentration.

5. Galkadawala:

- **Salt Content Range:** 417 to 473 mg/L
- **Average Salt Content:** 460.2 mg/L

Galkadawala also has moderate salt content with values ranging from 417 to 473 mg/L. The variability is slightly higher than Bulana Wewa and Thumbikulama, but still indicates a generally stable salt concentration.

Overall Conclusion

1. Salt Content Comparison:

- **Lowest Salt Content:** Kayan Wewa (354 to 358 mg/L)
- **Highest Salt Content:** Pattiya Wewa (531 to 834 mg/L)
- **Moderate Salt Content:** Bulana Wewa, Thumbikulama, and Galkadawala

2. Stability:

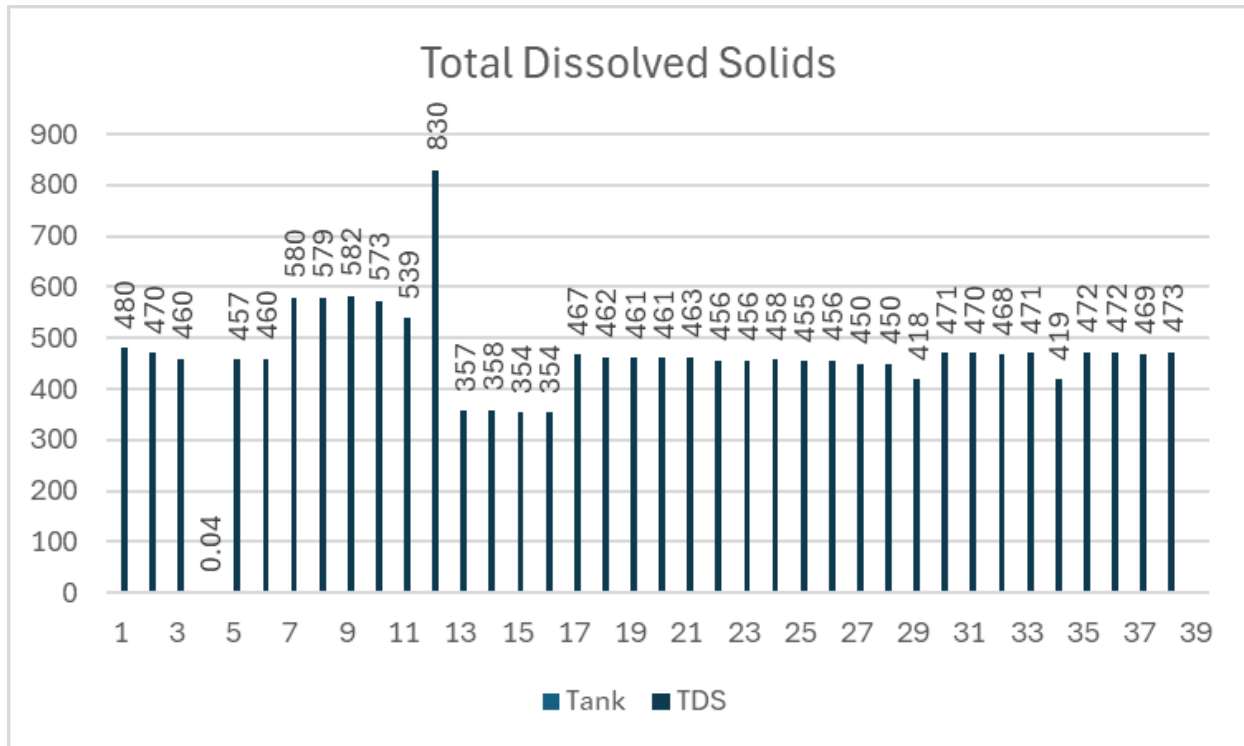
- **Most Stable:** Kayan Wewa, Bulana Wewa, Thumbikulama
- **Least Stable:** Pattiya Wewa (significant variability in salt content)

3. Recommendations:

- **Pattiya Wewa:** Due to high variability and highest salt content, it is recommended to investigate potential causes such as inflow variations, contamination sources, or localized factors affecting salt concentration.
- **Kayan Wewa:** Maintains low and stable salt content, indicating good water quality with respect to salinity.
- **Bulana Wewa, Thumbikulama, Galkadawala:** These tanks show moderate and stable salt concentrations, suggesting they are in a stable condition regarding salt content.

Regular monitoring and possibly identifying sources of variability or contamination in Pattiya Wewa would help maintain the water quality across all tanks. Overall, the tanks demonstrate relatively good water quality with stable salt concentrations, except for the variability seen in Pattiya Wewa.

Total Dissolved Solids



Summary

The dataset provides measurements of Total Dissolved Solids (TDS) in mg/L from five different tanks:

- Bulana Wewa
- Pattiya Wewa
- Kayan Wewa
- Thumbikulama
- Galkadawala

The following conclusions can be drawn from the TDS data:

1. Bulana Wewa:

- **TDS Range:** 0.04 to 480 mg/L
- **Average TDS (excluding anomaly):** 455.4 mg/L

Bulana Wewa shows a significant anomaly with a TDS value of 0.04 mg/L, which appears to be an outlier or error in measurement. Excluding this anomaly, the TDS values range between 457 and 480 mg/L, indicating a moderate and stable TDS concentration.

2. Pattiya Wewa:

- **TDS Range:** 539 to 830 mg/L
- **Average TDS:** 613.83 mg/L

Pattiya Wewa has the highest TDS range, indicating significant variability from 539 to 830 mg/L. This suggests potential fluctuations in water quality, possibly due to varying sources of water inflow or contamination.

3. Kayan Wewa:

- **TDS Range:** 354 to 358 mg/L
- **Average TDS:** 355.75 mg/L

Kayan Wewa exhibits the lowest and most stable TDS concentration, with values consistently around 354 to 358 mg/L. This indicates good water quality with minimal dissolved solids.

4. Thumbikulama:

- **TDS Range:** 450 to 467 mg/L
- **Average TDS:** 459.75 mg/L

Thumbikulama shows a moderate TDS range from 450 to 467 mg/L, indicating a stable TDS concentration with relatively low variability.

5. Galkadawala:

- **TDS Range:** 418 to 473 mg/L
- **Average TDS:** 469.2 mg/L

Galkadawala also shows moderate TDS values, ranging from 418 to 473 mg/L. The slight variability suggests generally stable water quality with respect to dissolved solids.

Overall Conclusion

1. TDS Content Comparison:

- **Lowest TDS:** Kayan Wewa (354 to 358 mg/L)
- **Highest TDS:** Pattiya Wewa (539 to 830 mg/L)
- **Moderate TDS:** Bulana Wewa, Thumbikulama, Galkadawala

2. Stability:

- **Most Stable:** Kayan Wewa, Thumbikulama, Galkadawala
- **Least Stable:** Pattiya Wewa (significant variability in TDS content)
- **Anomaly:** Bulana Wewa (anomalous TDS value of 0.04 mg/L should be investigated)

3. Recommendations:

- **Pattiya Wewa:** Due to the high variability in TDS, it is recommended to investigate potential causes such as different water inflow sources, evaporation rates, or localized contamination.
- **Kayan Wewa:** Maintains low and stable TDS content, indicating good water quality with respect to dissolved solids.
- **Bulana Wewa:** Excluding the anomaly, TDS values indicate moderate stability. The outlier should be examined for potential measurement errors or unusual conditions.
- **Thumbikulama and Galkadawala:** Both tanks show moderate and stable TDS concentrations, suggesting generally good and stable water quality.

Regular monitoring and addressing the variability in Pattiya Wewa and the anomaly in Bulana Wewa would help maintain consistent water quality across all tanks. Overall, the tanks demonstrate relatively good water quality with stable TDS concentrations, except for the issues noted.