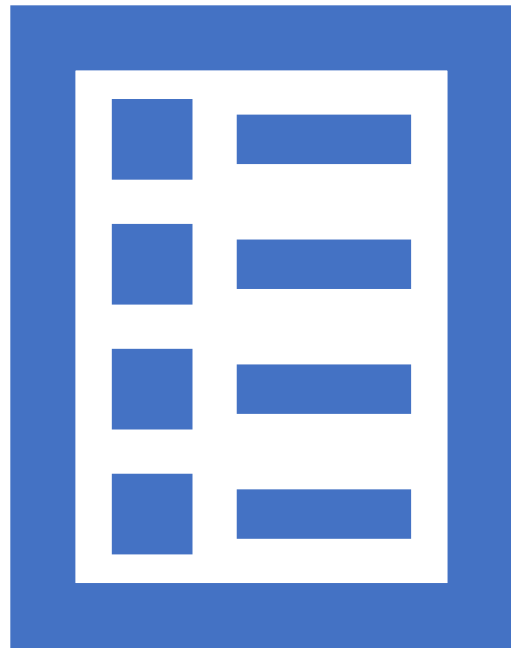


SOIL HEALTH: A RIDGE TO
REEF ASSESSMENT OF SOIL
PROPERTIES ALONG THE
VAISIGANO RIVER AND
POTENTIAL
CLIMATE CHANGE
IMPACTS

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Introduction

Rationale:

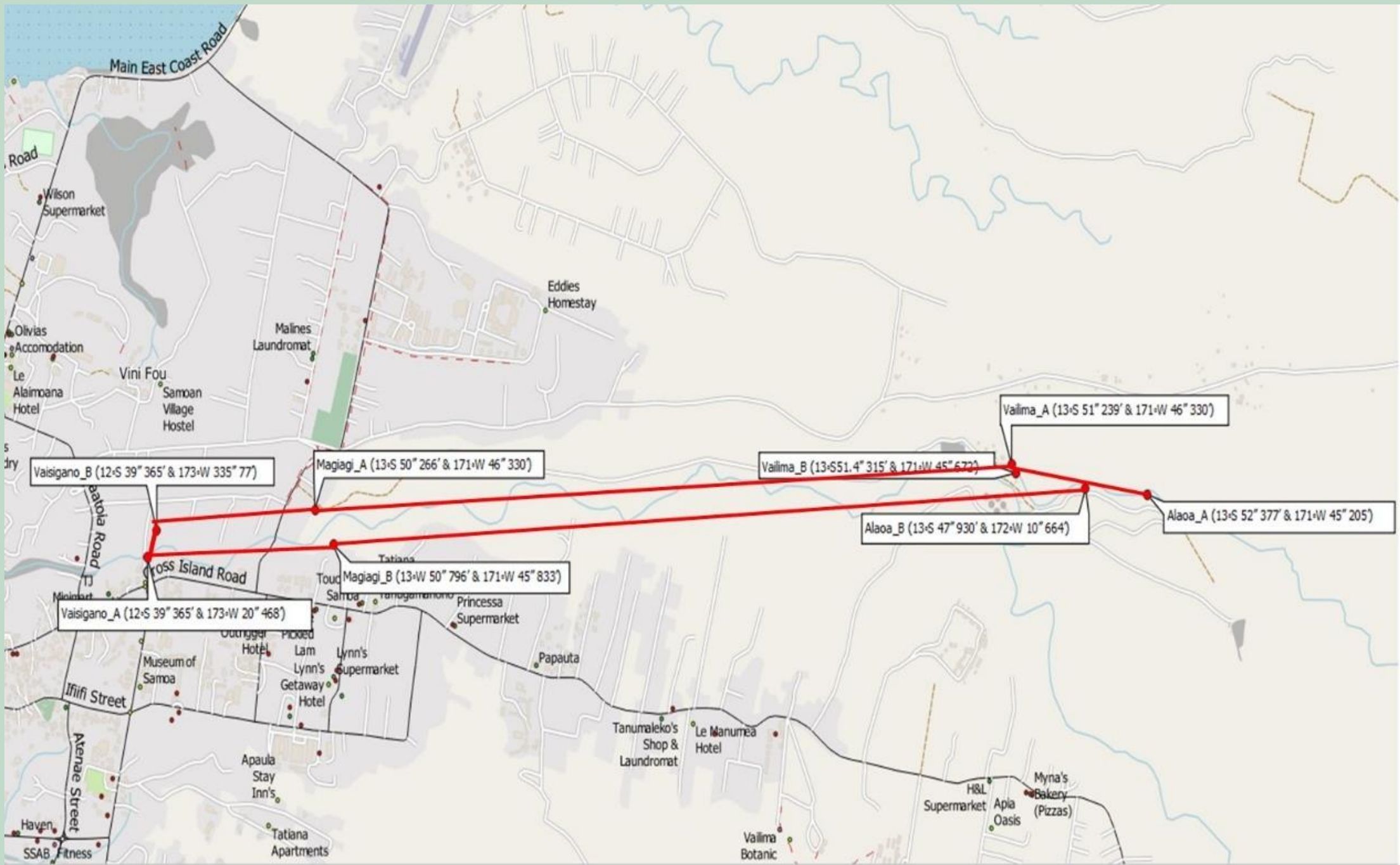
Limited Data Regarding
Soil Health;
Build data or add more to
the data pool of Samoa;
To seek potential changes
in soil well-being in contrast
to the past

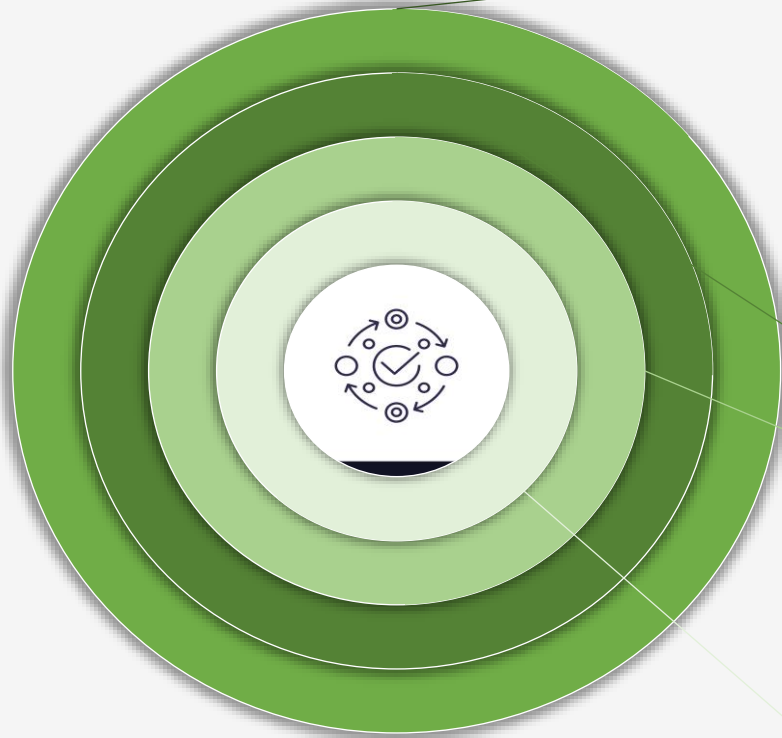
Main Research Question:

What is the current trend of
the health status
of soil in Samoa from ridge to
reef (R2R) and how climate
change a global issue
influences
the changes within the
properties of Soil?

Objectives:

1. Assess the health status of soil using physical, chemical and biological indicators.
2. Compare the spatial and temporal distribution of micro/macronutrients in soil.
3. Investigate climatic factors influencing soil carbon and soil health.





Methodology

SAMPLE PREPARATION

- Collection of samples
- Sieving of samples

ANALYTICAL ANALYSIS:

Physical properties: moisture factor & soil texture (on-site)
Biological analysis: soil microbial biomass C
Physical analysis: pH, Electroconductivity (EC), Cation Exchange Capacity (CEC), Soil Organic Carbon (SOC), C: N ratio, and the concentration of macronutrients (Olsen Phosphorous (OP) and Total N; exchangeable bases, Ca, K, Mg, Na) and micronutrients

STATISTICAL ANALYSIS
RAINFALL PATTERN ANALYSIS

Table 3.1: Physical distribution of moisture factor and soil type of site 1 (mean ± SE).

Sites	Moisture Factor	Soil Texture
	Mean ± SE	
Ala_a	1.08 ± 0.02	Sandy Loam
Ala_b	1.07 ± 0.01	Sandy Loam
Vail_a	1.05 ± 0.02	Sandy Loam
Vail_b	1.04 ± 0.01	Sandy Loam
Mag_a	1.07 ± 0.01	Sandy Loam
Mag_b	1.06 ± 0.01	Sandy Loam
Vais_a	1.06 ± 0.01	Sandy Loam
Vais_b	1.07 ± 0.01	Sandy Loam

R E S U L T S

Table 3.2: Mean distribution of pH, EC, CEC, SOC, Total N, and C: N of all sites (mean ± SE)

Site	pH	EC mS/m	CEC meq/100g	SOC %	C: N Ratio
Ala_a	6.48 ± 0.11	30.47 ± 3.48	15.89 ± 4.11	2.69 ± 1.47	10.5:1 ± 2.62
Ala_b	6.38 ± 0.12	42.33 ± 4.82	25.07 ± 4.92	1.73 ± 0.16	11.7 :1± 2.27
Vail_a	6.17 ± 0.11	40.78 ± 3.64	22.43 ± 5.04	5.02 ± 3.02	13.6:1 ± 3.48
Vail_b	5.08 ± 0.49	24.15 ± 5.45	16.77 ± 2	1.31 ± 0.26	8.9:1 ± 1.36
Mag_a	6.62 ± 0.1	29.7 ± 10.4	14.77 ± 0.7	1.78 ± 0.41	23.3:1 ± 8.02
Mag_b	7 ± 0.08	28.57 ± 6.9	16.66 ± 1.43	1.14 ± 0.12	13.7:1 ± 2.09
Vais_a	6.83 ± 0.11	39.27 ± 3.05	24.3 ± 5.26	1.29 ± 0.12	16.2:1 ± 4.47
Vais_b	6.5 ± 0.14	44.8 ± 9.06	33.88 ± 9.61	2.14 ± 0.31	30.4:1 ± 7.94
Total	6.4 ± 0.16	35 ± 4.55	21.2 ± 4.13	2.14 ± 0.73	16:01 ± 4.01

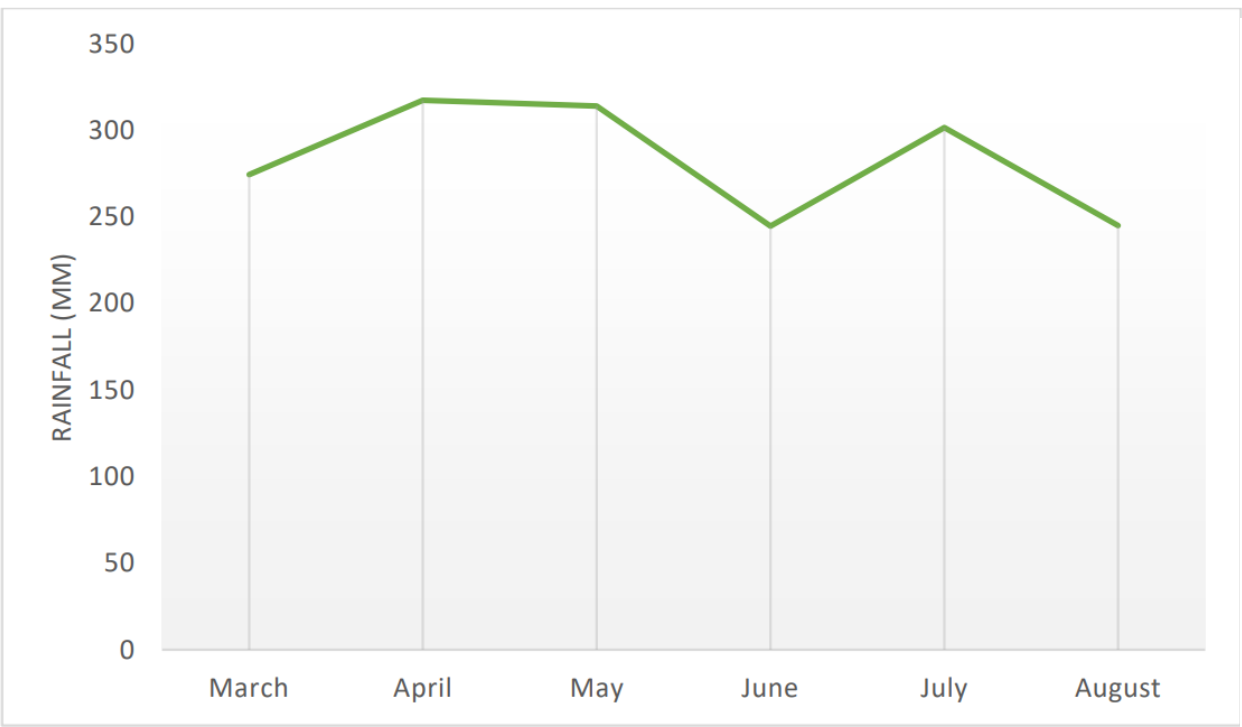


Figure 3. 2: Afiamalu station rainfall data from March- August.

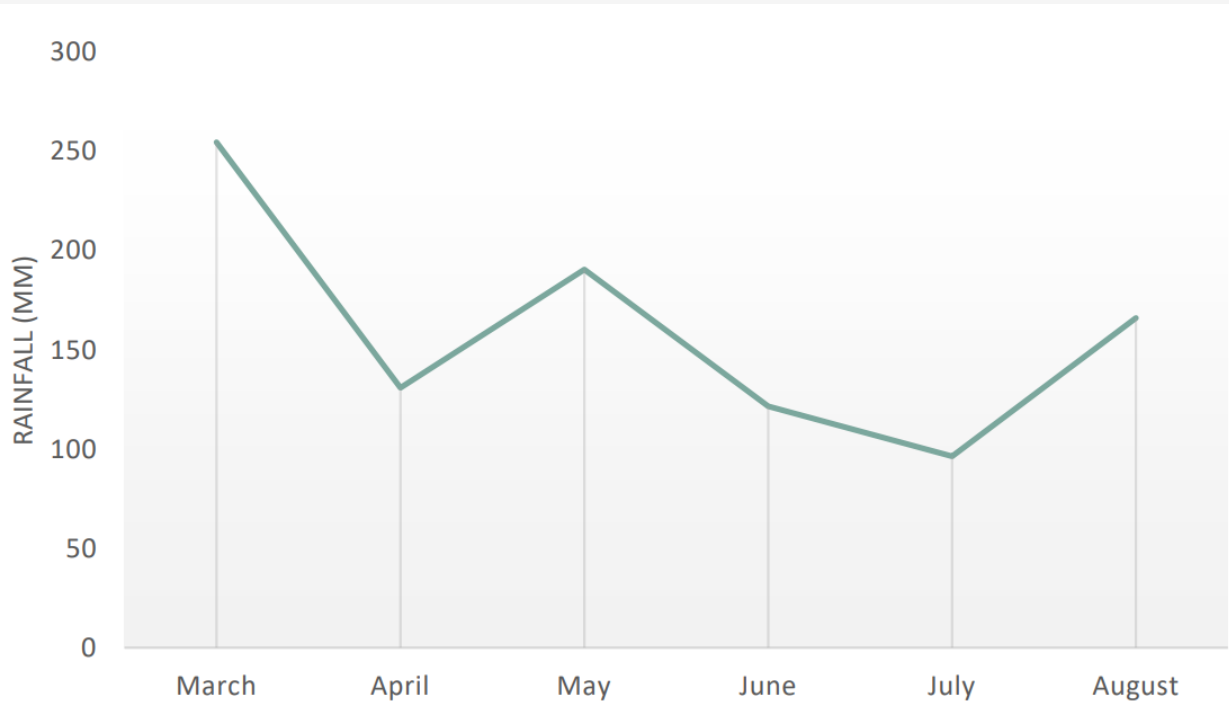


Figure 3.2: Apia station rainfall data from March to August.

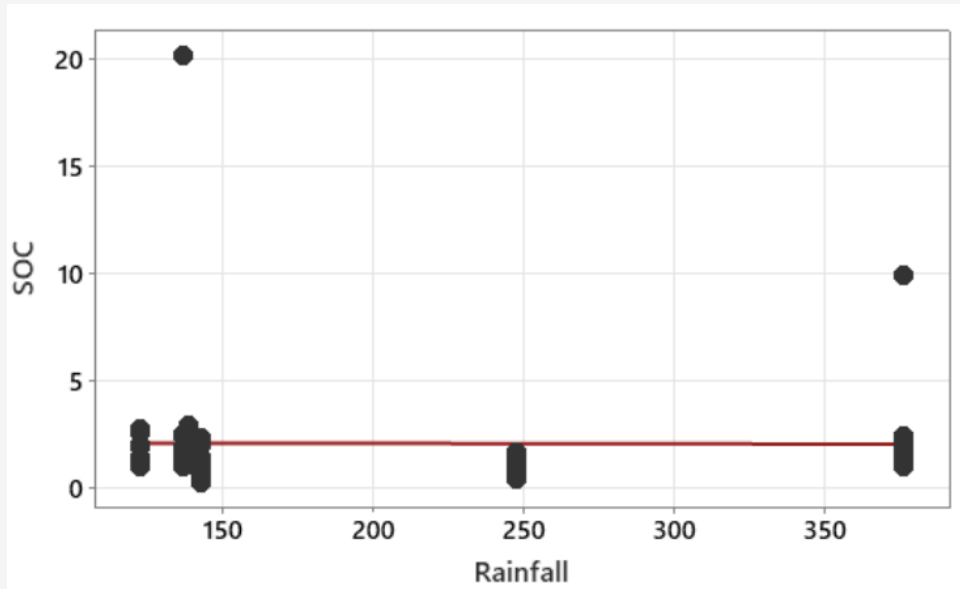


Figure 3. 11: A linear regression analysis between rainfall and soc.

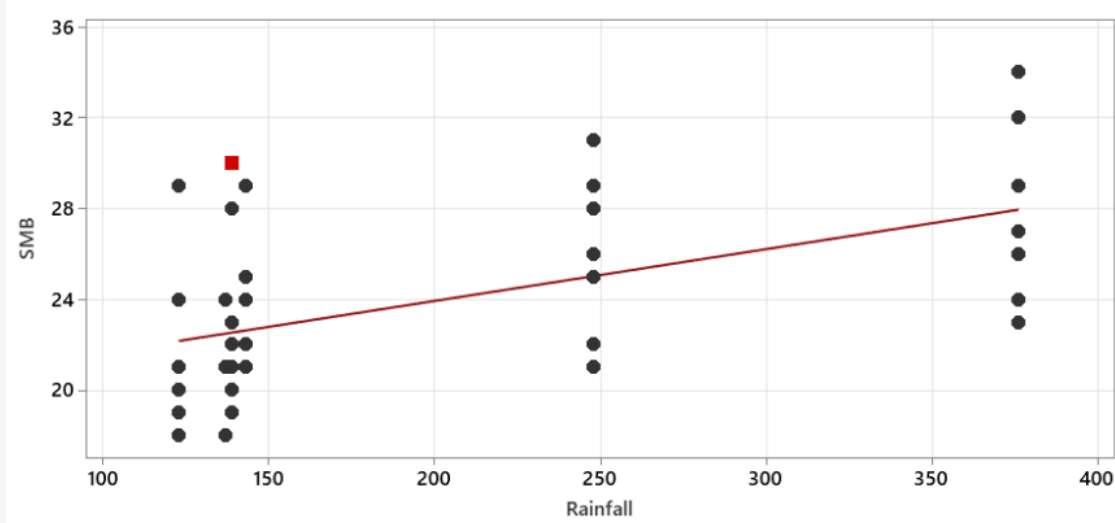
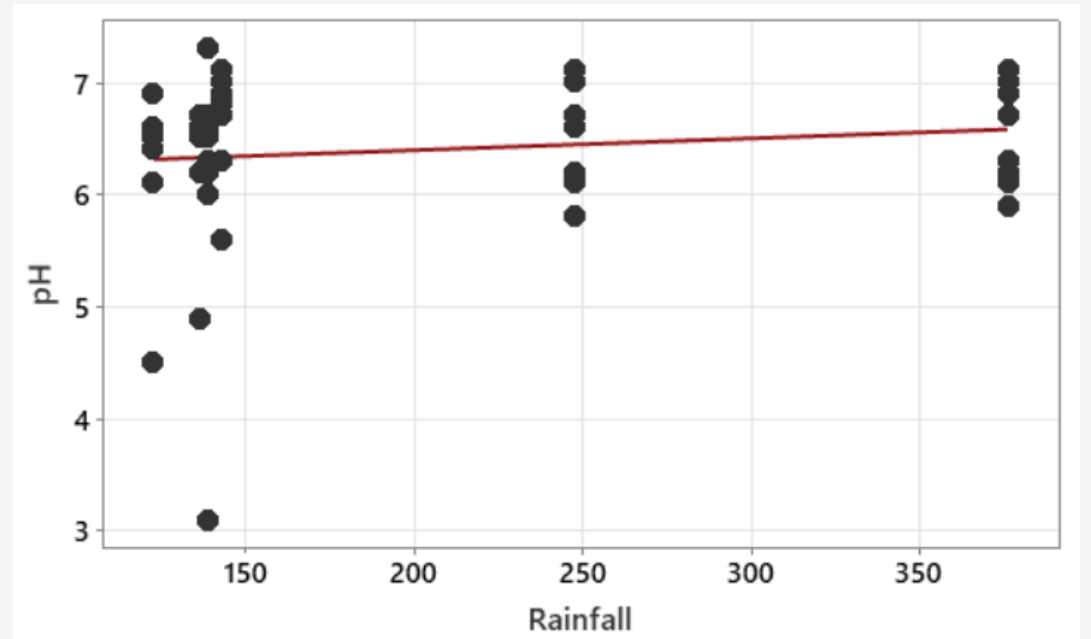


Figure 3. 9: Linear regression analysis on the impact of rainfall (x) to SMB (y).

CONCLUSION

- Except for pH, the other selected variables such as SOC, CEC, and Total N have decreased since then. Existing studies in Samoa have to be carried to seek reasons and factors responsible for such changes. However, non-latent/qualitative evidence was provided such as the construction of water and power stations in Alaoa and Vailima, new developments along the river of sites Magiagi and Vaisigano.
- Therefore, except for the variables related to climate change, other chemical properties, physical and biological properties are still adequate.

Limitations & recommendations

- The same study on other locations of Samoa such as the heavily populated Apia, Vaitele should be considered (industrialized area).
- 10 year analysis on soil health should be considered as another indicator to assess climate change impacts from ridge to reef.
- This has the potential to create a large and accurate data pool if carried out for a longer timeframe such as every 10 years.



Journey as a researcher in
SAMOA