GREEN AUDIT-WATER AND SOIL MANAGEMENT

Environmental auditing is a process where by an organization's environmental preference is tested against the environmental policies and objectives. As part of such policies internal environmental audit (Green Audit) is conducted to evaluate the actual scenario of the campus.

Objectives

To assess the quality of water and soil in the Baselius College Campus, Kottayam.

Water Management

Sources of water in the College Campus are well water, municipality water and rain water. These water resources are always susceptible to contamination by unintentional wastes. The quality of the water can be tested by analysing it for different quality parameters. If any contaminants are present water treatment options are available to improve our water quality. Of the two well water resources one is used for drinking purpose and the other one is used for household purposes of College hostel. The tap water is used for all other purposes for which the sources are harvested rain water and municipality water. The usage of water in labs is reduced by conducting microscale experiments.

The soil and water samples were collected and analysed at **Tropical Institute of Ecological Sciences, Vellor P.O, Kottayam** according to the standard methods like Flame photometry, UV-Visible Spectrophotometry, Kjeldahl's method,Complexometry, Acidimetry and Conductometry.

Onsite visit

To assess the green cover of the Institution a few days visit was conducted by the Green Audit team. The soil and water sample collection was carried out during the visit.

The sampling areas of water samples by the College Campus are given in Table I.

Table I

Sample	Area
I	Rainwater and Municipality water
II	Well water I- near Chem Laboratory
III	Muncipality water
IV	Well water II - College ground

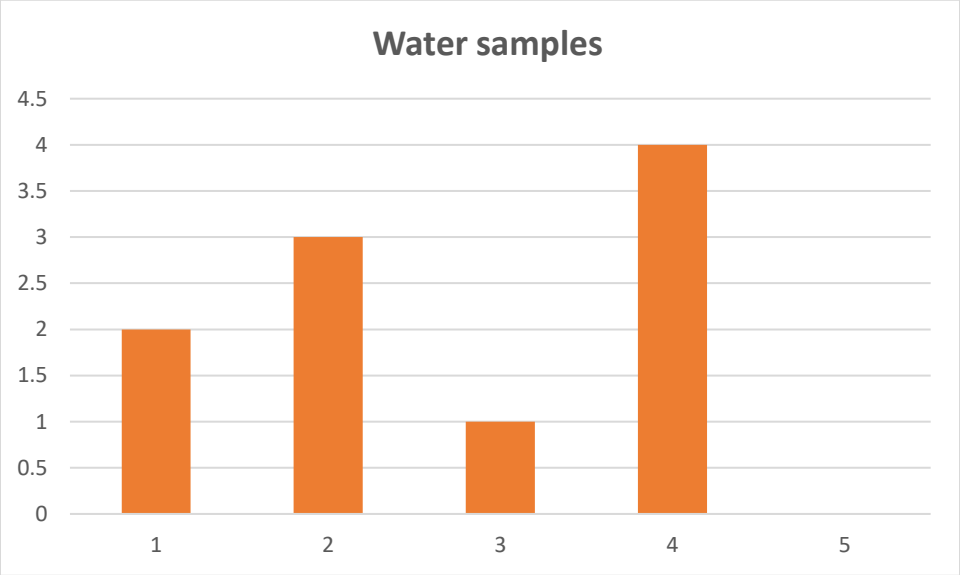
These water samples were analysed for its quality parameters. The quality parameters include pH,Conductivity, Total Dissolved Salts (TDS), Salinity, Alkalinity, Chlorinity, Total Hardness, Ca+ ions, Mg+ ions, MPN count (Most probable number) and E.coli.. The data obtained are given in Table

TableII

SL NO	Parameter	**Sample I**	**Sample II**	**Sample III**	**Sample IV**	**Desirable limits as per IS - 10500-2012**
1	**pH**	**6.5**	**7.0**	**5.9**	**6.8**	**6.5-8.5**
2	**Conductivity**	**13.0**	**46**	**169.0**	**38**	**1476 µS**
S	**Total dissolved salts**	**12.0**	**52**	**42.0**	**201.0**	**500mg/L**
4	**Salinity**	**0.006**	**0.042**	**0.174**	**0.032**	**3ppt**
5	**Acidity**	**18.0**	**8.0**	**23**	**10.0**	**200mg/L as $CaCO_3$**
6	**Alkalinity**	**18.0**	**60.0**	**64**	**30.0**	**200 mg/L as $CaCO_3$**
7	**Chlorinity**	**0.0111**	**0.0777**	**0.322**	**0.059**	**250 mg/L as $CaCO_3$**
8	**Total hardness**	**0**	**36.0**	**144.0**	**40.0**	**300mg/ L as $CaCO_3$**
9	**Ca+ ions**	**0**	**10.0**	**20.0**	**16.0**	**75 mg /L as Ca+**
10	**Mg+ ions**	**0**	**26.0**	**124.0**	**24.0**	**80 mg/L as Mg+**
11	**MPN count**	**1100**	**460**	**1100**	**0**	**0/100ml**
12	**E. Coli**	**absent**	**absent**	**absent**	**absent**	**absent**

Based on the above data the pollutedness decreases in the order sample3 Municipality water >sample1 Rain water+Municipality water > sample2 Well water 1 near Chem Lab >sample4.Well water 2 College ground Only sample 4 is well fit for drinking purpose, MPN-

0.By proper recommendation we could try for the better result. The result can be represented in the form of a chart as



Soil Management

The sampling areas of soil samples were given in Table III.

Table III

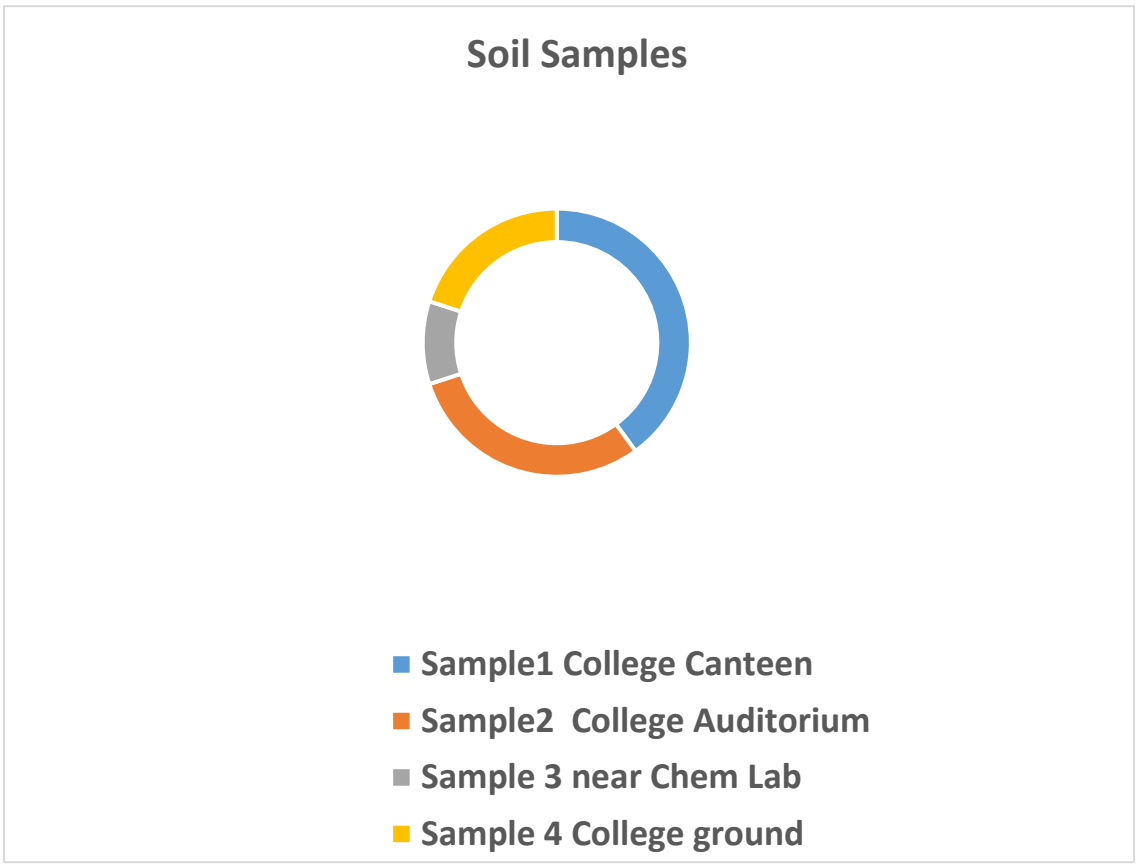
Soil samples	Area
I	College canteen
II	College auditorium
III	College Chem lab-near butterfly garden
IV	College ground

The analysis results are given in Table IV

Table IV

Sl No	Sample I	Sample II	Sample III	Sample IV	Parameters
1	7.2	5.4	7.1	7.0	pH
2	1.2	1.2	0.98	1.3	Nitrogen (N)
3	0.15	0.75	0.12	0.73	Phosphorus(mg/100g)
4	152.55	152.55	58.33	98.71	Potassium (Kg/ha-1)
5	10.5	10.5	9.8	10.6	Organic carbon (OC) (%)

The soil samples were analysed to determine the parameters pH, NPK and organic carbon. The soil productivity is determined primarily by organic matter which constitutes less than 5% of the soil. Here the samples contain about 10% organic carbon. Most crops perform best and a wide range of nutrients are available with a soil of pH between 6 and 7. Here all soil samples were found suitable for gardening plants and its suitability decreases in the order Sample I > Sample II> Sample IV > Sample III. By proper recommendation the fertility of sample III can be enhanced. The results can be expressed as:



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Approved Research Centre, Mahatma Gandhi University, Kottayam
Approved Laboratory, Kerala State Pollution Control Board
T I E S - t i e s M i n d a n d N a t u r e

To : Baselius College, Kottayam
Ref. No : ST13-ST16/ TIES/2019
Request Date : 13/11/19

SOIL TEST RESULTS

Sr. No.	Parameter	Sample value ST13 – I	Sample value ST14 -II	Sample value ST15 – III	Sample value ST16 – IV
1	pH	7.2	5.4	7.1	7.0
2	Nitrogen (N)	1.2	1.2	0.98	1.3
3	Phosphorous (P) (mg/100g)	0.15	0.75	0.12	0.73
4	Potassium (K) (kg/ha^{-1})	152.55	152.55	58.33	98.71
5	Organic carbon (OC) (%)	10.5	10.5	9.8	10.6

Signature of Scientist In-Charge:

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T I E S - t i e s M i n d a n d N a t u r e

To : Baselius College, Kottayam
Ref. No : F2781/ TIES/2019
Request Date : 13.11.2019
Date of Testing : 13.11.2019

WATER QUALITY RESULTS

Sr. No.	Parameter	Sample value	Desirable limits as per IS:10500-2012
1	pH	6.5	6.5 – 8.5
2	Conductivity	13.0	1476 µS
3	Total Dissolved Solids	12.0	500 mg/L
4	Salinity	0.006	3 ppt
5	Acidity	18.0	200 mg/l as $CaCO_3$
6	Alkalinity	18.0	200 mg/l as $CaCO_3$
7	Chlorinity	0.0111	250 mg/l as $CaCO_3$
8	Total Hardness	0	300 mg/l as $CaCO_3$
9	Ca^+ ions	0	75 mg/l as Ca^+
10	Mg^+ ions	0	80 mg/l as Mg^+
11	MPN Count	1100	0/100ml
12	*E. coli*	Absent	Absent

Sampling source : Not mentioned (Sample1)
Comment : Unfit for drinking purpose without proper treatment if the parameters exceed the desirable limits as per IS: 10500-2012.
Remarks : Sample not collected by this Institute.

Signature of Scientist In-charge:

22/11/2019
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T I E S - t i e s M i n d a n d N a t u r e

To : Baselius College, Kottayam
Ref. No : F2782/ TIES/2019
Request Date : 13.11.2019
Date of Testing : 13.11.2019

WATER QUALITY RESULTS

Sr. No.	Parameter	Sample value	Desirable limits as per IS:10500-2012
1	pH	7.0	6.5 – 8.5
2	Conductivity	46.0	1476 µS
3	Total Dissolved Solids	52.0	500 mg/L
4	Salinity	0.042	3 ppt
5	Acidity	8.0	200 mg/l as $CaCO_3$
6	Alkalinity	60.0	200 mg/l as $CaCO_3$
7	Chlorinity	0.0777	250 mg/l as $CaCO_3$
8	Total Hardness	36.0	300 mg/l as $CaCO_3$
9	Ca^+ ions	10.0	75 mg/l as Ca^+
10	Mg^+ ions	26.0	80 mg/l as Mg^+
11	MPN Count	460	0/100ml
12	*E. coli*	Absent	Absent

Sampling source : Not mentioned (Sample 2)
Comment : Unfit for drinking purpose without proper treatment if the parameters exceed the desirable limits as per IS: 10500-2012.
Remarks : Sample not collected by this Institute.

Signature of Scientist In-charge:

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T I E S - t i e s M i n d a n d N a t u r e

To : Baselius College, Kottayam
Ref. No : F2783/ TIES/2019
Request Date : 13.11.2019
Date of Testing : 13.11.2019

WATER QUALITY RESULTS

Sr. No.	Parameter	Sample value	Desirable limits as per IS:10500-2012
1	pH	5.9	6.5 – 8.5
2	Conductivity	169.0	1476 µS
3	Total Dissolved Solids	42.0	500 mg/L
4	Salinity	0.174	3 ppt
5	Acidity	22.0	200 mg/l as $CaCO_3$
6	Alkalinity	64.0	200 mg/l as $CaCO_3$
7	Chlorinity	0.322	250 mg/l as $CaCO_3$
8	Total Hardness	144.0	300 mg/l as $CaCO_3$
9	Ca^+ ions	20.0	75 mg/l as Ca^+
10	Mg^+ ions	124.0	80 mg/l as Mg^+
11	MPN Count	1100	0/100ml
12	*E. coli*	Absent	Absent

Sampling source : Not mentioned (Sample 3)
Comment : Unfit for drinking purpose without proper treatment if the parameters exceed the desirable limits as per IS: 10500-2012.
Remarks : Sample not collected by this Institute.

Signature of Scientist In-charge:

22/11/2019
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T I E S - t i e s M i n d a n d N a t u r e

To : Baselius College, Kottayam
Ref. No : F2784/ TIES/2019
Request Date : 13.11.2019
Date of Testing : 13.11.2019

WATER QUALITY RESULTS

Sr. No.	Parameter	Sample value	Desirable limits as per IS:10500-2012
1	pH	6.8	6.5 – 8.5
2	Conductivity	38.0	1476 µS
3	Total Dissolved Solids	201.0	500 mg/L
4	Salinity	0.032	3 ppt
5	Acidity	10.0	200 mg/l as $CaCO_3$
6	Alkalinity	30.0	200 mg/l as $CaCO_3$
7	Chlorinity	0.059	250 mg/l as $CaCO_3$
8	Total Hardness	40.0	300 mg/l as $CaCO_3$
9	Ca^+ ions	16.0	75 mg/l as Ca^+
10	Mg^+ ions	24.0	80 mg/l as Mg^+
11	MPN Count	0	0/100ml
12	*E. coli*	Absent	Absent

Sampling source : Not mentioned (Sample 4)
Comment : Fit for drinking purpose as per the desirable limits of IS: 10500-2012.
Remarks : Sample not collected by this Institute.

Signature of Scientist In-charge:

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