NAGALAND POLLUTION CONTROL BOARD

Signal Point, Dimapur – 797112, Nagaland
Tel.: 03862-245727, TeleFax; 03862-245726
Website: www.npcb.nagaland.gov.in e-mail: npcb2@yahoo.com

NPCB/GAR/ 715 **Date: 28/06/2024**

To

The Principal
Baptist College
Kohima, Nagaland

Sub: Green Audit Report-regarding

Sir,

Nagaland Pollution Control Board has reviewed the Green Audit Report submitted by Baptist College, Kohima, Nagaland. Moreover, the board has inspected the activities carried out within the college campus on 24 June 2024.

The Board extends appreciation towards the performance of the college. It further encourages the college to take up more activities in the field of protection of the environment.

Encl:

i) Green Audit Certificate
ii) Report on Ambient Air Quality Monitoring
iii) Recommendation

Yours faithfully,

(K HUKATO CHISHI, IFS)
Member Secretary
Nagaland Pollution Control Board

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REPORT ON AMBIENT AIR QUALITY MONITORING

Nagaland Pollution Control Board monitored the ambient air quality at Baptist College, Zubza on 25th June, 2024.

The monitoring was carried out for 24 hours (starting from 06:00 am 25th June, 2024 till 06:00 am 26th June, 2024) to assess the ambient air quality using instrument namely New Improved Respirable Dust Sampler Envirotech APM 460 NL.

Respirable Dust Sampler is used for sampling of Particulate Matter (PM_{10}). PM_{10} refers to fine particles that are 10 micrometers (μm) or smaller in diameter. This instrument was operated to assess the ambient air quality especially the particulate matter within the campus and its surrounding.

TEST REPORT

Date of Monitoring : 25th June, 2024.
Location : Baptist College, Zubza.
Duration : 24 hourly (06:00 AM to 06:00 AM)

MONITORING REPORT:

Time	06:00 AM-02:00 PM	02:00 PM-10:00 PM	10:00 PM-06:00 AM	24 hourly average
RSPM (PM_{10})	29.37 μg/m^3	39.60 μg/m^3	25.60 μg/m^3	31.52μg/m^3

CONCLUSION:

According to National Ambient Air Quality Standards (NAAQS), the prescribed permissible limit for Respirable Suspended Particulate Matter (PM_{10}) for 24 hours is 100 μg/m^3 .The ambient air quality for Respirable Suspended Particulate Matter (PM_{10}) monitored at Baptist College premise for 24 hours was found to be **31.52 μg/m^3** which is below the permissible limit

Therefore, as per the monitoring carried out the ambient air quality of Baptist College, Zubza is within the permissible limit as per the National Ambient Air Quality Standards (NAAQS).

(Olivi Chophy)
S.S.A
Senior Scientific Assistant
Nagaland Pollution Control Board
Nagaland : Dimapur

(Yanathung Kithan)
Scientist B
Scientist 'B'
Nagaland Pollution Control Board
Nagaland : Dimapur

IQAC

Department of Chemistry
Kohima Science College, Jotsoma-797002
(An Autonomous Government PG College)

Dr. Daniel Kibami
Associate Professor

Mobile: + 919612310952
Email :danielkibs80@yahoo.co.in

Ref. no : KSCAJ/CHEM/Research/Analysis-02

Date 16th May 2024

Sir,

"Pursuant to your letter dated .....May 2024, requesting water quality testing from the Department of Chemistry, Kohima Science College, Jotsoma, I am pleased to submit the reports on the analyzed water samples. The report is presented in three parts:

Part One: A tabular presentation of the test results alongside acceptable and permissible Limits.

Part Two: A detailed discussion of the results and observations drawn from the water samples.

Part Three: A concise summary of the entire experiment, highlighting the key findings and conclusions.

With regards,

Dr. Daniel Kibami
Principal Investigator & Associate Professor
Kohima Science College, Jotsoma, Nagaland

Sl. No	Parameters	Kohima Campus	Main water source (hostel water)	Delhu Spring Water	Sebu Spring water	Acceptable limit	Permissible limit
1	pH	8.1	8.5	8.7	7.9	6.5-8.5	No relaxation
2	TDS (mg/l)	4.05	3.21	12.54	8.93	500	2000
3	Conductivity (µs)	6.26	4.91	19.3	13.72	400	2000
4	Dissolved Oxygen (mg/l)	3.75	4.72	3.24	2.84	6-8	No relaxation
5	Total Hardness (mg/l)	190	180	278	292	200	600
6	Calcium(mg/l)	14.42	5.61	21.64	22.44	75	200
7	Alkalinity (mg/l)	60	30	93	81	200	600
8	Chloride (mg/l)	50	50	50	70	250	1000
9	Magnesium(mg/l)	83.31	40.43	54.56	57.48	30	100
10	Iron(mg/l)	ND	ND	1	3	0.3	No relaxation
11	Sulphate(mg/l)	ND	ND	48	34	200	400
12	Salinity (mg/l)	4.67	3.69	14.47	10.3	250	600
13	Fluoride (mg/l)	0.3	0.33	ND	ND	1	1.5
14	Phosphate (mg/l)	5.4	0.4	0.4	7.2	1	5
15	Nitrate (mg/l)	ND	ND	ND	ND	45	50
16	Zinc (mg/l)	ND	0.31	ND	ND	5	15

ND- Not Detected

Results and Observation

The pH is the measurement of hydrogen ion concentration in water. It indicates whether the water is acidic or alkaline. For the given samples taken for analysis, the pH value for Sebu spring water was 7.9 which indicates the water is neutral in nature. For the other three samples the pH values ranged from 8.1-8.7 which shows a slightly alkaline in nature, but still within the acceptable range for potable water. According to the World Health Organization (WHO) and the United States Environmental Protection Agency (EPA), the recommended pH range for drinking water is between 6.5 and 8.5. However, some agencies may have slightly different guidelines. Water with a pH of 8.1-8.7 is considered slightly alkaline, but it is still considered safe for drinking. Keep in mind that pH is just one factor to consider when evaluating water potability. Other parameters like turbidity, bacterial content, and chemical contaminants should also be considered.

Total Dissolved Solids (TDS) is a measure of the dissolved combined content of all inorganic and organic substances in molecular, ionized, or micro-granular (colloidal sol) suspended form in water. As per the BIS guidelines, a TDS level below 500 mg/L is acceptable. Generally, the TDS level between 50-150 is considered as most suitable and acceptable. In the present study, the concentration of TDS was found in the range **3.21 – 12.54** mg/L indicating very low TDS levels, water samples for the present study may be considered "soft" water. Low TDS lacks essential minerals however such water can be used for drinking and domestic purposes with additional treatment.

The values of Electrical Conductivity of all the samples are within the standard value of WHO (2500 µS/cm).This values ranges from **4.91 – 19.3** µS/cm which indicates that the water is relatively low in dissolved ions and minerals, this may be characteristic of soft water, low mineral water, Rainwater .

Dissolved oxygen refers to the level of free, non-compound oxygen present in water or other liquids which also indicates the ability of the water body to sustain aquatic life. It is an important parameter in assessing water quality because of its influence on the organisms living within a body of water. It is generally considered that DO levels of at least 4-6ppm are sufficient for most aquatic life however healthy water generally have DO concentrations above 6.5-8mg/L. In this study, the dissolved oxygen (DO) levels vary from **2.84 – 4.72** mg/L which indicates that the water has moderate to adequate oxygen levels. The low values of DO for the present study could be

because DO experiments are usually done on sitewithin 30 minutes from the collection site.

The Total Hardness is the property of water which prevents the lather formation with soap. For the present study, the total Hardness (TH) range of **180-292** mg/L in water samples indicates that the water is moderately hard to hard which may require some water treatment or softening to prevent scaling, soap scum buildup, and spotting on surfaces. Total Hardness measures the total concentration of calcium and magnesium ions, which are the primary causes of water hardness.

Calcium is present in all water bodies, making it one of the most abundant elements foundin natural water. The Calcium content in the supplied water samples ranged from **5.61-22.44** mg/L which indicates that the water contains moderate to significant levels of calcium.

Alkalinity refers to the measure of the capacity of the water to neutralize the acids, it is the water's capacity to resist changes in pH that would make the water more acidic. Alkalinity is important in the treatment of waste water and drinking water. The BIS value of alkalinity in water is 200mg/L. Concentrations less than 100 mg/L are desirable for domestic water supplies. For the present study the alkalinity values ranged from **30- 93** mg/L which suggests that the water samples have

- Moderate alkalinity levels (30-50 mg/L), which can help stabilize pH and neutralize acids.
- High alkalinity levels (50-93 mg/L), which can indicate a high capacity to neutralize acids and stabilize pH, but may also contribute to scaling and corrosion issues.

Chloride is a naturally occurring element that is common in most natural waters and is most often found as a component of salt (NaCl) or in some cases in combination with potassium or calcium. The Chloride content for the water samples were found within the permissible limit within the range of **50-70** mg/L which suggests that the water samples have:

- Moderate to high Chloride levels, which may affect the taste and odor of the water
- Levels that may cause corrosion issues with certain metals, like steel and copper
- Levels that may contribute to scaling issues, especially in combination with high hardness levels
- Levels that may be suitable for industrial applications, but may require treatment for drinking water or sensitive industrial uses.

A magnesium concentration range of **40.43 - 83.31** mg/L in water indicates that the water has significant levels of magnesium. Magnesium is an essential mineral, and its presence in water can affect water hardness, scaling, and corrosion. In the present case, the magnesium range of 40.43-83.31 mg/L suggests that the water samples have:

- High to very high magnesium levels, which may contribute to water hardness and scaling
- Levels that may cause precipitation of magnesium salts, leading to staining or sedimentation
- Levels that may affect the taste and odor of the water
- Levels that may require treatment or softening to prevent scaling and corrosion issues

Keep in mind that magnesium levels can vary depending on the source and geology of the water, and it's important to consider other water quality parameters, like calcium and total hardness, to get a comprehensive understanding of the water's properties.

The analysis of water samples from Kohima campus and the main water source revealed no presence of iron. However for Delhu and Sebu the Iron content was 1 and 3 mg/L, an iron content range of 1-3 mg/L in water samples indicates that the water has moderate to high levels of iron. Iron is a naturally occurring element in water, and its presence can affect the taste, odor, and appearance of the water, as well as its potential for staining and corrosion.

A moderate level of sulphate was detected in Delhu and Sebu water source which was far below the permissible limit 200 mg/L.

Salinity is the amount of salt dissolved in a body of water, high values of salinity are usually indicative of pollution. In our present study the salinity level ranged from 3.69-14.47 mg/L which is well below the permissible limit (250 mg/L) indicating relatively low to moderate levels of salinity. The water sources for the present study are free from contaminants/pollutants.

A relatively low Fluoride content of 0.3 mg/L and 0.33 mg/L was detected from Kohima campus and the main water source, a low fluoride levels can be beneficial for drinking water.

Phosphates are chemicals containing the element Phosphorus and they affect water quality by causing excessive growth of algae. Phosphates enter waterways from human and animal waste, phosphorus rich bedrock, laundry, cleaning, industrial efluents, and fertilizer runoff. These

phosphates become detrimental when they over fertilize aquatic plants and cause stepped up eutrophication. There is no BIS standard permissible limit for phosphate for drinking water, while WHO(1993) has fixed it to be 5 mg/L. In this study, the phosphate values were observed between 0.4 – 7.2 mg/L which indicates a moderate concentration which:

- May be suitable for most aquatic life and drinking water purposes

- May indicate some impact from human activities like fertilizers or sewage, but still within acceptable limits.

- May require monitoring to ensure levels don't increase and cause environmental issues

Nitrate was not detected for the given water samples which indicates a very low concentration or absence of this parameters for the given water samples.

A low level of Zinc (0.31 mg/L) was detected in the main water source (Hostel), this level might indicate:

- Are generally suitable for drinking water and most aquatic life.

- May indicate minimal impact from industrial or agricultural activities that can release zinc into water.

- Are unlikely to cause taste, odor, or aesthetic issues

RESULTS IN BRIEF

"The water quality analysis revealed that the samples from Sebu spring water and other sources have a neutral to slightly alkaline pH range (7.9-8.7), which is within the acceptable limits for drinking water. The Total Dissolved Solids (TDS) levels were found to be very low (3.21-12.54 mg/L), indicating soft water with minimal mineral content. The Electrical Conductivity values (4.91-19.3 µS/cm) suggest low levels of dissolved ions and minerals. The Dissolved Oxygen (DO) levels ranged from 2.84-4.72 mg/L, indicating moderate to adequate oxygen levels. The Total Hardness (TH) levels were moderate to hard (180-292 mg/L), requiring potential water treatment or softening. The Calcium content was moderate to significant (5.61-22.44 mg/L), while Alkalinity levels were moderate to high (30-93 mg/L). Chloride levels were moderate to high (50-70 mg/L), and Magnesium levels were high to very high (40.43-83.31 mg/L). Iron was detected in Delhu and Sebu water sources (1-3 mg/L), while Sulphate levels were moderate (below 200 mg/L). Salinity levels were relatively low to moderate (3.69-14.47 mg/L). Fluoride levels were low (0.3-0.33 mg/L), and Phosphate levels were moderate (0.4-7.2 mg/L). Nitrate was not detected, and Zinc levels were low (0.31 mg/L)."

Concluding remarks:

The water quality analysis suggests that the water sources are generally suitable for drinking and domestic purposes, with some parameters requiring monitoring and potential treatment. The low TDS and mineral content may require additional treatment for drinking water. The moderate to high levels of Magnesium and Chloride may require consideration for industrial applications. The absence of Nitrate and low levels of Zinc are positive indicators. Overall, the water sources are relatively free from contaminants and pollutants, but regular monitoring is recommended to ensure continued water quality and safety.

1.2 ENERGY AUDIT REPORT

A. Energy Audit Report, Sechü campus: The following table shows the energy consumption pattern of the college for a month.

Sl. No.	Electrical Appliances/ instruments	Number(units)	Power(W)/ unit	Usage per Day(h)	kWh	No. of days in a month	Total consumption per month
1.	LED tube light	60	22	5	6.6	25	165
2.	LED bulbs	146	9	5	6.57	25	164.25
3.	Computer	1	250	5	1.25	25	31.25
4.	Laptops	10	50	3	1.5	15	22.5
5.	UPS	1	700	5	3.5	25	87.5
6.	Projector	1	280	2	0.56	20	11.2
7.	Printers	1	60	1	0.06	5	0.3
8.	Refrigerators	3	350	24	25.2	30	756
9.	Water boiler	2	1500	1	3	30	90
10.	Rice cooker	2	1500	2	6	30	180
11.	Room fans	21	40	4	3.36	15	50.4
12.	Immersion rod	1	1500	1	1.5	5	7.5
						Grand total	1565.9

Baptist College, Sechü campus has an average consumption of 1565 kWh electricity in a month and the electricity bill for a month is Rs. 11925. The electricity bill for a year is Rs. 143100.

3/6/24

NAME - KHALIBA

PGT (physics)

BAPTIST HIGH, KOHIMA

B. Energy Audit Report, Kohima Campus: The following table shows the energy consumption pattern of the college for a month.

Sl. No.	Electrical Appliances/instruments	Numbers (units)	Power (W)/ unit	Usage per day(h)	kWh	No. of days in a month	Total consumption per month
1.	LED tube light	24	22	6	3.168	25	79.2
2.	LED bulbs	282	9	6	15.228	25	380.7
3.	Computer	26	250	2	13	25	325
4.	Laptops	2	50	1	0.1	25	2.5
5.	Copier	1	650	1	0.65	20	13
6.	Projector	5	280	2	2.8	10	28
7.	Printer	7	60	2	0.84	25	21
8.	Copy Printer	1	800	0.5	0.4	1	0.4
9.	CCTV camera	16	7	24	2.688	30	80.64
10.	Inverters	2	90	2	0.36	25	9
11.	Smoke Censor	11	9	24	2.376	30	71.28
12.	Fire Alarm system	5	24	24	2.88	30	86.4
13.	Room heater	3	2	0.5	0.003	5	0.015
						Grand Total	1097.135

Baptist College, Kohima campus has an average consumption of 1097 kWh electricity in a month and the electricity bill for a month is Rs. 5000. The electricity bill for a year is Rs 60,000.

3/6/24

NAME - Khaliba.

PGT (physics)

BAPTIST HIGH, KOHIMA.

1.3. WASTE MANAGEMENT:

Most of the waste generated in the college are solid waste which contain both biodegradable and non-biodegradable fraction. Biodegradable waste are segregated, collected and disposed off by digging a pit whereas, non- biodegradable solid waste (for e.g., metal, glass, plastic) are disposed off through scrap dealers or collected by Kohima Municipal Council (KMC).

E-waste or digital rubbish are electronic items which are used and discarded. And in an institution, it is a challenge to dispose the waste since improper disposal of electronic waste can directly affect our environment and indirectly cause serious health concern by releasing harmful pollutants like lithium, mercury, polychlorinated biphenyl (PCBs) polluting soil and water. Thereby, we collaborate with E-CIRCLE based in Dimapur with partnering agency Hulladek Recycling Private Limited- Kolkata to dispose our e-waste sensitizing the students to Rethink, Reuse, Repair and recycle. The college is a plastic free zone discouraging one time plastic use. Efforts have been made to reduce its usage and segregation of waste are being adopted by the College. Different types of waste generated in the college and their disposal:

Sl no.	Types of waste	Particulars	Disposal methods
1.	E-wastes	Old computers, printers, calculators,	E-CIRCLE partnering agency Hulladek Recycling Private Limited- Kolkata.
2.	Plastic waste	Pen, plastic water bottle, and other plastic containers, etc.	Disposed and collected by Kohima Municipal Council (KMC)
3.	Solis waste (non-biodegradable)	Paper waste, tissue paper, sanitary napkins, medicine covers, broken furnitures, metals, etc.	Disposed and collected by Kohima Municipal Council (KMC)
4.	Solid waste (biodegradable)	Kitchen waste/domestic waste, paper waste, horticulture waste, dead plants and animals, etc.	Dumped into the soil by creating a pit (temporary compost pit)
5.	Waste water	Kitchen waste water, washing, urinal, bathrooms, etc.	Channelled through proper drainage systems.

1.4. IDENTIFICATION OF FOREST TYPE, PLANT SPECIES AND SOIL CHARACTERISTICS IN THE CAMPUS:

IQAC.

DEPARTMENT OF BOTANY
KOHIMA SCIENCE COLLEGE
(An Autonomous, Government P. G. College)
JOTSOMA

Dated 01.06.2024

RESULTS OF FIELD SURVEY

Check List of Plant Species and Soil Characteristics in Baptist College Campus

1. VEGETATION

Forest Type:

The Forest in the campus is broad- leaved, mixed forest lying between 1000 to 1300m asl. It is a secondary climax community as evidenced by the dominance pattern, species composition and young age of trees. The physiognomy of the vegetation is similar to surrounding areas of Zubza, marked by high species diversity of trees and moderately dense canopy that is mostly deciduous.

Tree species:

Seventy one (71) tree species have been recorded through field survey. *Schima wallichii* and *Lithorcapus* are the dominant tree species with high frequency, density and DBH. The mean DBH of mature trees is 23 cm. *Populus deltoides* is a prominent tree species in the area due to its large size (dbh up to 45 cm) and attaining a height of 80 ft or more.

Herbs, Shrub and vine species

The ground vegetation is sparse in most areas except near streams and gorges. Some ornamental species were observed including *Tacca, Hedychium, Wisteria, Ardisia,* etc. Vines are a common sight.

Table 1: Check List of tree species (Sorted by family name in alphabetical order)

	Botanical Name	Family Name
1	*Saurauia napaulensis* DC.	Actinidiaceae
2	*Choerospondias axillaris (Roxb.) B.L.Burtt & A.W.Hill*	Anacardiaceae
3	*Rhus semialata* Murr.	Anacardiaceae
4	*Spondias pinnata* (L.f.) Kurz	Anacardiaceae
5	*Toxicodendron acuminatum* (DC.) C.Y. Wu & T.L. Ming	Anacardiaceae
6	*Brassaiopsis mitis* C.B.Clarke	Araliaceae
7	*Brassaiopsis glomerulata* (Blume) Regel	Araliaceae
8	*Macropanax dispermus* (Blume) Kuntze	Araliaceae

9	*Macropanax rosthornii* (Harms) C.Y.Wu ex G.Hoo	Araliaceae
10	*Alnus nepalensis* D.Don	Betulaceae
11	*Betula alnoides* Buch.-Ham. ex D.Don	Betulaceae
12	*Betula utilis* D.Don	Betulaceae
13	*Carpinus viminea* Wall. ex Lindl.	Betulaceae
14	*Garcinia anomala* Planch. & Triana	Clusiaceae
15	*Lyonia ovalifolia* (Wall.) Drude	Ericaceae
16	*Macaranga pustulata* King ex Hook.f.	Euphorbiaceae
17	*Mallotus nepalensis* Müll.Arg.	Euphorbiaceae
18	*Adenopodia spicata* (E.Mey.) C.Presl	Fabaceae
19	*Albizia chinensis* (Osbeck) Merr.	Fabaceae
20	*Bauhinia variegata* L.	Fabaceae
21	*Dalbergia sericea* G.Don	Fabaceae
22	*Derris* sp.	Fabaceae
23	*Erythrina stricta* Roxb.	Fabaceae
24	*Castanopsis tribuloides* (Sm.) A.DC.	Fagaceae
25	*Lithocarpus fenestratus, (Roxb.) Rehder*	Fagaceae
26	*Quercus semiserrata* Roxb.	Fagaceae
27	*Exbucklandia populnea* (R.Br. ex Griff.) R.W.Br.	Hamamelidaceae
28	*Engelhardtia spicata* Lechen ex Blume	Juglandaceae
29	*Gmelina arborea* Roxb. ex Sm.	Lamiaceae
30	*Actinodaphne glomerata* (Blume) Nees	Lauraceae
31	*Actinodaphne* sp.	Lauraceae
32	*Cinnamomum zeylanicum* Blume	Lauraceae
33	*Litsea chartacea* Hook.f.	Lauraceae
34	*Litsea cubeba* (Lour.) Pers.	Lauraceae
35	*Machilus salicina* Hance	Lauraceae
36	*Phoebe hainesiana* Brandis	Lauraceae
37	*Phoebe* sp.	Lauraceae
38	*Bombax ceiba* L.	Malvaceae
39	*Grewia* sp.	Malvaceae
40	*Dysoxylum* sp.	Meliaceae
41	*Melia azedarach* L.	Meliaceae
42	*Cedrela odorata* L.	Meliaceae
43	*Cedrela serrata* Royle	Meliaceae
44	*Toona ciliata* M.Roem.	Meliaceae
45	*Ficus auriculata* Lour.	Moraceae
46	*Ficus nerifolia* Sm.	Moraceae
47	*Ficus prostrata Buch.-Ham. ex Wall.*	Moraceae
48	*Myrica esculenta* Buch.-Ham. ex D. Don	Myricaceae
49	*Maesa indica* (Roxb.) A. DC.	Myrsinaceae

50	*Syzigium* sp.	Myrtaceae
51	*Syzygium tetragonum* (Wight) Wall. ex Walp.	Myrtaceae
52	*Holarrhena pubescens* Wall. & G.Don	Oleaceae
53	*Phyllanthus emblica* L.	Phyllanthaceae
54	*Ziziphus jujuba* Mill.	Rhamnaceae
55	*Docynia indica* (Wall.) Decne.	Rosaceae
56	*Firmiana colorata (Roxb.) R. Br.*	Rubiaceae
57	*Psychotria* sp.	Rubiaceae
58	*Wendlandia glabrata* DC.	Rubiaceae
59	*Tetradium fraxinifolium* (Hook. f.) T.G. Hartley	Rutaceae
60	*Zanthoxylum acanthopodium* DC.	Rutaceae
61	*Populus deltoides* W.Bartram ex Marshall	Salicaceae
62	*Salix* sp.	Salicaceae
63	*Pyrularia edulis* (Wall.) A. DC.	Santalaceae
64	*Firmiana colorata* (Roxb.) R.Br.	Sterculiaceae
65	*Sterculia urens* Roxb.	Sterculiaceae
66	*Styrax serrulatus* Roxb.	Styracaceae
67	*Eurya acuminata* DC.	Theaceae
68	*Schima wallichii* Choisy	Theaceae
69	*Trema orientalis* (L.) Blume	Ulmaceae
70	*Callicarpa tomentosa* (L.) L.	Verbanaceae
71	*Vitex* sp.	Verbenaceae

Table 2: Check List of herb, shrub and vine species (Sorted by family in alphabetical order)		
1	*Actinidia* sp.	Actinidiaceae
2	*Sambucus nigra* L.	Adoxaceae
3	*Heptapleurum venulosum* (Wight & Arn.) Seem.	Araliaceae
4	*Rhaphidophora* sp.	Araliaceae
5	*Ageratina adenophora* (Spreng.) R.M.King & H.Rob.	Asteraceae
6	*Bambusa tulda* Roxb.	Bambusaceae
7	*Tacca* sp.	Dioscoreaceae
8	*Wisteria* sp.	Fabaceae
9	*Dichroa* sp.	Hydrangeaceae
10	*Smilax spinosa* Mill.	Liliaceae
11	*Melastoma malabathricum* L.	Melastomataceae
12	*Osbeckia stellata* Buch.-Ham. ex Ker Gawl.	Melastomataceae
13	*Ardisia crenata* Sims	Myrsinaceae
14	*Peperomia* sp.	Piperaceae
15	*Piper* sp.	Piperaceae
16	*Thysanolaena latifolia* (Roxb. ex Hornem.) Honda	Poaceae
17	Rubus ellipticus Sm.	Rosaceae
18	*Mussaenda roxburghii* Hook.f.	Rubiaceae

19	*Ophiorrhiza mungos* L.	Rubiaceae
20	*Rubia manjith* Roxb. ex Fleming	Rubiaceae
21	*Selaginella* sp.	Selaginellaceae
22	*Elatostema lineolatum* Wight	Urticaceae
23	*Verbena officinalis* L.	Verbanaceae
24	*Clerodendrum* sp.	Verbenaceae
25	*Cayratia pedata* (Wall.) Gagnep.	Vitaceae
26	*Tetrastigma* sp.	Vitaceae
27	*Leea indica* (Burm. f.) Merr.	Vitaceae
28	*Hedychium* sp.	Zingiberaceae

2. SOIL CHARACTERISTICS

The soil texture of both Kohima and Sechii are Sandy Loam. Soil pH for Sechii campus is moderately acidic as is typical of forest soil but the same parameter for Kohima Campus is Neutral. Both places recorded high organic content and comparatively low soil moisture

Table 3: Soil Test Results

Location	Soil Parameters			
	Soil texture	Soil pH	Soil moisture (%)	Soil Organic matter
Sechii campus	Sandy loam	4.9	23 %	3.78 % (High)
Kohima Campus	Sandy loam	7.4	17 %	4.14 % (High)

(Dr. Wenyitso Kapfo)
HoD
Department of Botany

NAGALAND POLLUTION CONTROL BOARD

Signal Point, Dimapur – 797112, Nagaland
Tel.: 03862-245727, TeleFax; 03862-245726
Website: www.npcb.nagaland.gov.in e-mail: npcb2@yahoo.com

Green Audit Report
Recommendations

Nagaland Pollution Control Board has reviewed the responses to Green Audit Questionnaire submitted by Baptist College, Kohima, Nagaland. The board has conducted physical verification of the college campus on 24 June 2024. In this regard, NPCB would like to further supplement the following recommendations for upgradation of the college in the field of sustainable development, conservation and protection of the environment.

1. **Green Cover and Nature Conservation:**

i) Green habitat concept should be adopted for all the building construction activities of the institute in future, which may help a long way in reducing energy usage, increasing aesthetic appeal of the buildings and class rooms, besides reducing carbon foot print. Further, more green spaces should be established all around the campus around larger trees and shades for the benefit of the students.

ii) Frame long-term eco-restoration programmes with indigenous trees and frame a holistic campus development plan to foresee the future developmental needs.

2. **Waste Management:**

i) Propose a system for collection and disposal of waste sorted out as organic (biodegradable) and non biodegradable on a daily basis, managed by the campus administration. It is suggested to keep two bins (blue colour bins for dry waste and green colour bins for wet waste or in case of non availability of blue and green colour bins, the bins can be labelled as Dry Waste and Wet Waste in large fonts for visibility to all) in and around the campus to ensure segregation of waste at source. Segregation of waste at source should be strictly maintained and monitored for long run effective management of waste. [Every waste generator shall segregate and store the waste generated by them in three separate streams namely bio-degradable, non bio-degradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time (Duties of waste generators from Solid Waste Management Rules, 2016)].

ii) A system for composting should be ensured for the biodegradable waste within the campus. Biodegradable waste after composting can be used to maintain the garden. The compost generated can be used for promoting organic farming activities within

the campus and the products can be used in hostels and canteens, with a plan to ensure the availability of organic food in the canteen and hostels for future. This will aid not only in effective management of waste and protection of the environment but also it will help to develop healthy lifestyle habits.

iii) Plastic waste can be segregated and stored which can further be sent to recyclers or authorized scrap dealers. The Ministry of Environment, Forest and Climate change has ban the use of 20 Single Use Plastic items with effect from July 1 2022 across the country. In regard to this notification, the use of Single Use Plastic banned items (copy enclosed) in the college premises especially in the college canteen should be strictly prohibited.

iv) Practice the 3 R's : Reduce, Reuse, Recycle in whichever way possible.

v) At all cost, open burning of waste should be avoided.

vi) The last resort for waste which cannot be compost/ recycled/ treated can be disposed in a landfill/ traditionally made pit. "Sanitary land filling " means the final and safe disposal of residual solid waste and inert wastes on land in a facility designed with protective measures against pollution of ground water, surface water and fugitive air dust, wind-blown litter, bad odour, fire hazard, animal menace, bird menace, pests or rodents, greenhouse gas emissions, persistent organic pollutants slope instability and erosion; (Solid Waste Management Rules, 2016)

vii) E waste should be segregated and send to the collection centres. There are two collection centres available in Nagaland:

a) E Circle
Address: House no. 93 C khel Diphupar Dimapur, Nagaland
Contact: 7005811236 / 8794549067

b) Karo Sambhav
Address: House no. 57 4th Mile opposite TV centre i-khel Dimapur, Nagaland
Contact: 6909865225

3. Water Management:

i) It is highly recommended that Rainwater harvesting facilities be established at the campus, foreseeing future needs of water. The campus at present has ample space for construction of Rainwater harvesting structures and therefore this should be kept in priority. Moreover with the growing number of students and further development of infrastructure within the campus, water conservation should be practiced from now on. Further, rainwater pits can be prepared at appropriate places identified with the assistance of Department of Geology and restoration activities may be initiated to sustain the health of ponds and wetlands in the campus.

ii) To eliminate the spillage and over usage of water in washbasins, urinals and toilet push taps are highly recommended.

4. Energy Management:

It is suggested to opt for cleaner energy such as solar energy and that solar panels may be installed in the campus. The public lights within the campus may be run with solar panels.

5. Carbon Footprint:

Vehicle pooling should be promoted both among students and faculty.

6. Academic Curriculum:

Irrespective of the subjects, environmental education should be part of curriculum. Alternatively one credit may be given to students participating in environmental conservation/awareness activities.

It is recognized that the maintenance of the healthy environment is not the responsibility of the state alone. It is the responsibility of every citizen and thus a spirit of partnership is to be realized through the environment management of the country.

The awareness programmes on Environmentment conducted by the college are highly recommendable and it is further suggested that more awareness programmes on environment should be conducted in the future. On embarking important environment occasions, the students should be instilled with the knowledge of protecting the environment and practice good habits in their day to day lives.

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report.

By realizing the need of responsibility towards environment, NAAC has added the concept of environmental audit in accreditation methodologies of universities and colleges.

To nurture environmental friendly management in academic institutions following aims and objectives were formulated:-

- To recognize the initiative taken by organization towards environment.
- To secure the environment and cut down the threats posed to human health.
- To provide baseline information to enable organization to evaluate and manage environmental change, threat and risk.
- To recognize, diagnose and resolve the environmental problems.
- To recognize the effects of an organization on the environment and vice versa.
- To identify and control the impact of activities of organizations on environment.

- To suggest the best protocols for sustainable development organization and environment.
- To assess environmental performance and the effectiveness of the measures to achieve the defined objectives and targets.
- To identify the different pressures on organizations to improve their environmental performance.
- To ensure that the natural resources are utilized properly as per national policy of environment.
- To establish the parameters for maintaining health and welfare of the community of the organization.
- To set the procedure for disposal of all types of harmful wastes.
- To reduce energy consumption.
- To give preference to the most energy efficient and environmentally sound appliances.
- To minimize the consumption of water and monitor its quality.
- To identify the risks of hazards and implement the policies for safety of stakeholders.
- To incorporate different aspects of disaster management.
- To train all students and staff of the college and empower them to contribute and participate in the environmental protection.
- To make sure that rules and regulations are taken care to avoid the interruptions in environment.

To sum up, Environmental auditing or Green Audit may be conducted by the College/University internal Green Audit team annually. The process should not be a one time or one year activity. It should rather be a process adhering to the sustainability of the environment. The process of Green Auditing should be an ongoing process. College should prepare Green Environmental policy and take efforts for sustainable development on the college campus.

(Mvudzeviu Shuya)
Scientist B

Scientist 'B'
Nagaland Pollution Control Board
Nagaland : Dimapur