



Gujranwala Guru Nanak Khalsa College

Civil Lines, Ludhiana (Punjab)

NAAC ACCREDITED, FULLY Wi-Fi CAMPUS

MULTI – FACULTY, POST GRADUATE & CO-EDUCATIONAL COLLEGE

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Green Audit Report (2015-2020)



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INTRODUCTION

Gujranwala Guru Nanak Khalsa College, honouring the wisdom and teachings of Sri Guru Nanak Dev ji, founder of Sikhism and the first of ten Sikh Gurus. He believes that all humans have an intrinsic sensitivity to a natural world; so everyone should love and show concern for the nature which is also a part of a holistic approach of life. The sacred vision for environment by Sri Guru Nanak Dev ji is composed as:

“Pavan Guru Pani Pita, Mata Dharat Mahat”

Means Air is the Guru, Water is the Father and The Earth is the Great Mother of all. So it is our mortal duty to preserve air, water and earth. With this mission, Gujranwala Guru Nanak Khalsa College, started different kinds of ‘Green Practices’ within and outside the college campus.

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The ‘Green Audit’ aims to analyse environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It is a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the various wastages which can be used for recycling projects. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus.

As environmental sustainability is becoming an increasingly important issue for the world, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit.

ABOUT THE COLLEGE

Gujranwala Guru Nanak Khalsa College, Ludhiana, originally established in C.E. 1917, as Guru Nanak Khalsa College, Gujranwala (Pakistan), it functioned as such till 1947. The vast campus, with imposing buildings, commodious hostels and playgrounds left by the college, now houses Govt. Islamia College, Gujranwala. Reconstructed in Ludhiana in C.E. 1953 as Gujranwala Guru Nanak Khalsa College, it has now grown into a first rank institute affiliated to the Panjab University, Chandigarh. The new campus, situated in Civil Lines, Ludhiana is not that expansive but with high rise buildings punctuated with lush green trees and a few lawns presents an enchanting atmosphere of serenity that facilitates academic activities. The college has a rich and glorious heritage of producing leaders, academicians, doctors, engineers, bureaucrats, and all in all good human beings. The various departments organize different activities like; conferences, seminars, symposiums, quiz competitions, etc. to prepare its students as well as the teachers for the present modern world.

OBJECTIVES OF GREEN AUDIT

The college has identified the following objectives under Green Initiative Program which are in tune with practice.

- To create awareness about the need to protect the environment and promote love for the surrounding biodiversity.
- To take effective measures for waste segregation, waste management, water management and E-waste collection.
- To implement 3 'R' (Reduce, Reuse, Recycle) policy on the campus.

- To use renewable energy resources (solar energy).
- To plant rare and medicinal/ herbal plants on the college campus.
- To support and implement '*Swachh Baharat Abhiyan*' for healthy India.
- To organize seminars, workshops activities etc. by the various committees on environmental related issues.

Clean environment is a basic necessity of human beings for health and efficiency. The main aim of the practice is to impart knowledge, create awareness and develop an attitude of concern and to nurture necessary skills to handle the environmental issues and challenges. The College is spread in four acres of lush green area. The institution works hard to maintain green environment on the campus.

METHODOLOGY

The study covered the following areas to summarize the present status of environment management in the campus:

- I. GREEN AREA MANAGEMENT
- II. AIR QUALITY MANAGEMENT
- III. ENERGY CONSERVATION
- IV. WASTE DISPOSAL MANAGEMENT
- V. E-WASTE MANAGEMENT
- VI. WATER MANAGEMENT

I. GREEN AREA MANAGEMENT

This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards. This also helps in ensuring that the Environmental Policy is enacted,

enforced and reviewed using various environmental awareness programmes. In total there are seven lawns and two playgrounds in college campus having so many plants, flowers, herbs and shrubs.

Not only inside the campus green belt of plants is also established. In addition to these lawns college also have its Botanical Garden in which we have thirty different varieties of plants and trees. There are many flowering plant varieties like Marigold, Rose, Petunia Bougainvillea etc. exist in our college campus. Above mentioned flora adds to major biodiversity of Punjab.

Gujranwala Guru Nanak Khalsa College has campus spread over area of 4 acres (22387.24 sq. meter).

The total covered area is 8070 sq. meter, including Administrative block (260.50 sq. meter), Computer Science block (356.74 sq. meter), Science Block (2274.26 sq. meter), Commerce block (1490.52 sq. meter), Library (417.84 sq. meter), Gurdwara Sahib (357.67 sq. meter), College Canteen (397.05 sq. meter), Auditorium (998.70 sq. meter), Management block (156.07 sq. meter), Parking area (891.86 sq. meter), Community college block (253.97 sq. meter), main staff room (83.86 sq. meter), Registrar office (35.76 sq. meter), Girls common room (113.99 sq. meter).

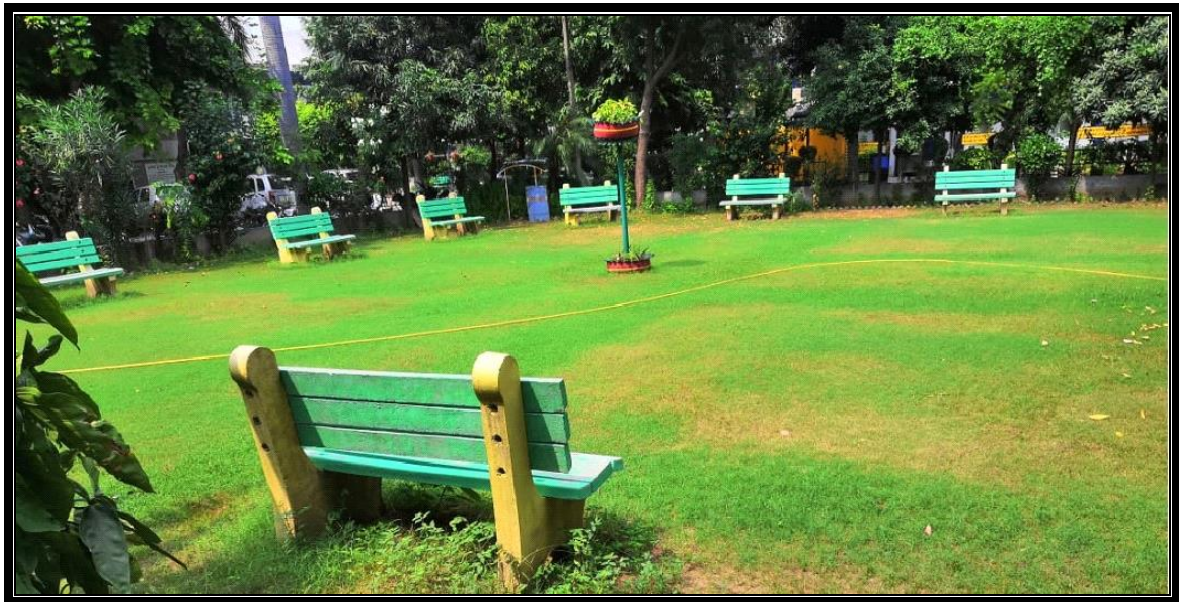
The total open area is (25252.45 sq. meter) including grounds (20749.33 sq. meter), Road and footpath (2473.89 sq. meter), Lawns (2029.23 sq. meter).

The total green area is 22778.56 sq. meter including playgrounds and lawns.

LAWNS OF THE COLLEGE



Lawn Outside Main Staff Room.



Lawn Opposite Guru Nanak Hall.



Science Block Lawn.



Guru Nanak Bagichi.



Lawn Near Parking Area.



Lawn Backside Guru Nanak Hall.



Lawn Adjacent to Administrative Block.

COLLEGE PLAYGROUNDS

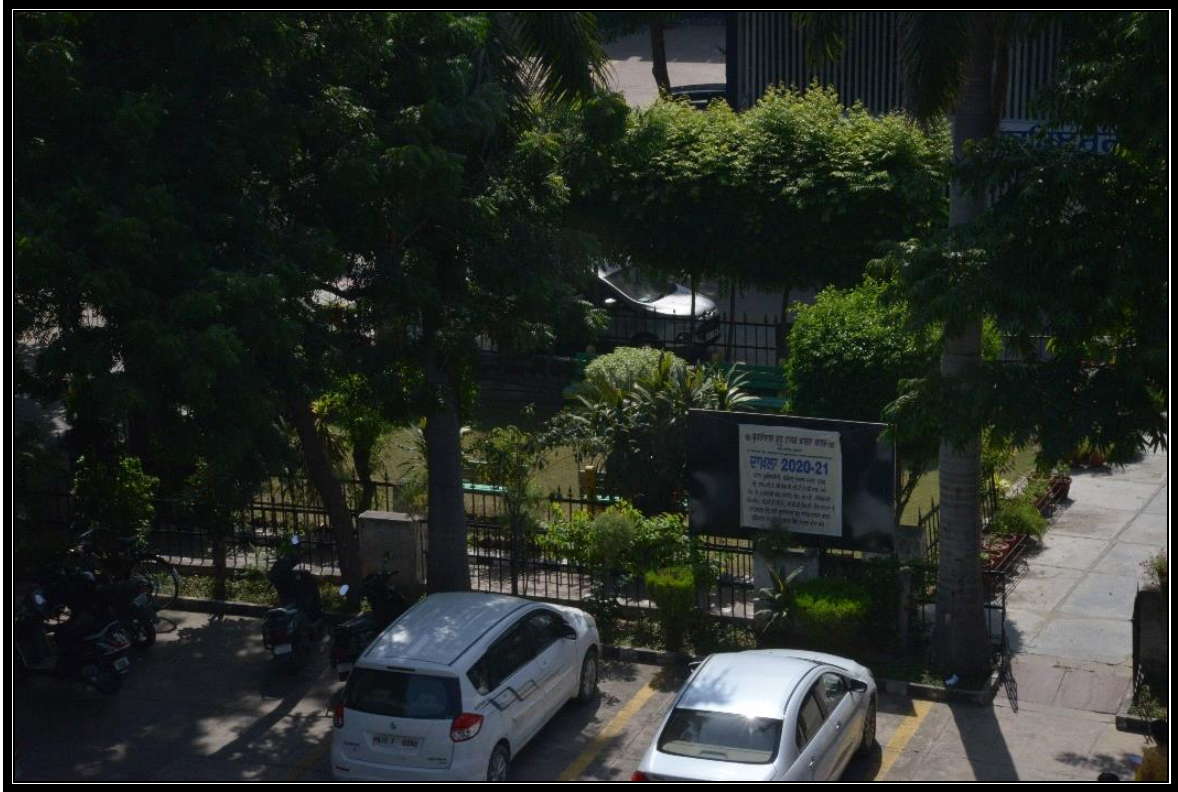


College Playgrounds Near Rose Garden Adjacent to GGN Public School.

LIST OF AVENUE TREES, SHRUBS, POT PLANTS, CLIMBERS AND MEDICINAL PLANTS

AVENUE TREES

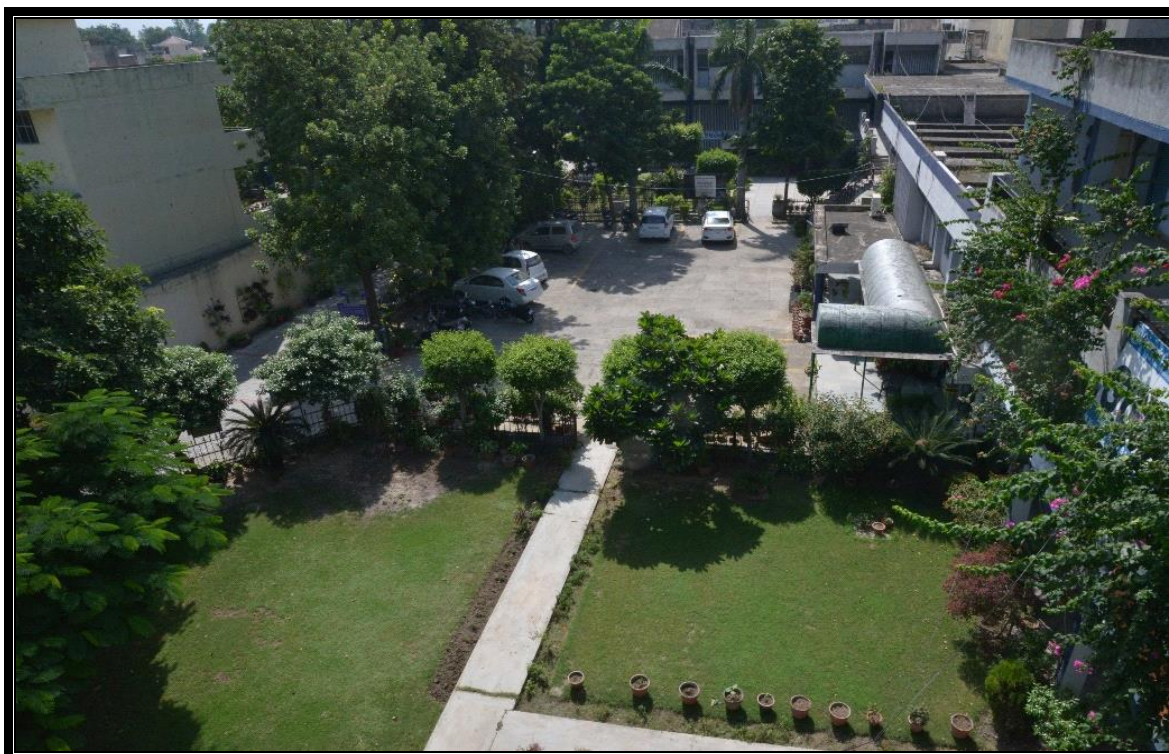
S.No.	Common Name	Botanical Name	Number
1.	Bottle brush	<i>Callistemon</i>	12
2.	Spanish cherry	<i>Mimusops elengii</i>	3
3.	Citrus	<i>Citrus spp.</i>	1
4.	Loquat	<i>Eriobotrya japonica</i>	1
5.	Mango	<i>Mangifera Indica</i>	3
6.	Red Gulmohar	<i>Delonix regia</i>	1
7.	Christmas tree	<i>Araucaria cookie</i>	1
8.	Ashoka	<i>Saraca indica</i>	6
9.	Chinese juniper	<i>Juniperus chinensis</i>	1
10.	Amaltas	<i>Cassia fistula</i>	2
11.	Kachnar	<i>Bauhinia variegata</i>	3
12.	Jivapota	<i>Putranjiva roxburghii</i>	9
13.	Northern black wattle	<i>Acacia auriculiformis</i>	1
14.	Plum	<i>Prunus domestica</i>	1
15.	Guava	<i>Psidium guajava</i>	1
16.	Northern white cedar	<i>Thuja compacta</i>	13
17.	Silver Oak	<i>Grevillea robusta</i>	1
18.	Bahera	<i>Terminalia belanica</i>	1
19.	Pilkhan	<i>Ficus virens</i>	4
20.	Sukhchain	<i>Pongamia pinnata</i>	1
21.	Satpatia/ Devil's tree	<i>Alstonia scholaris</i>	3



Green – Belt of Avenue Trees Along Pathways.



Shady Trees Adorning Gurudwara Sahib and Guru Nanak Bagichi.



Belt of Trees in Front of Administrative Block.

PALMS

S.No.	Common Name	Botanical Name	Number
1.	Fan palm	<i>Livistona chinensis</i>	8
2.	Areca palm	<i>Areca catechu</i>	6
3.	Parlour palm	<i>Chamaedorea elegans</i>	1
4.	Pygmy date palm	<i>Phoenix roebelenii</i>	14
5.	Travellers palm	<i>Ravenala madagascariensis</i>	1
6.	Sago palm	<i>Cycas revoluta</i>	8
7.	Rhapis palm	<i>Rhapis excelsa</i>	1
8.	Royal palm	<i>Roystonea regia</i>	3



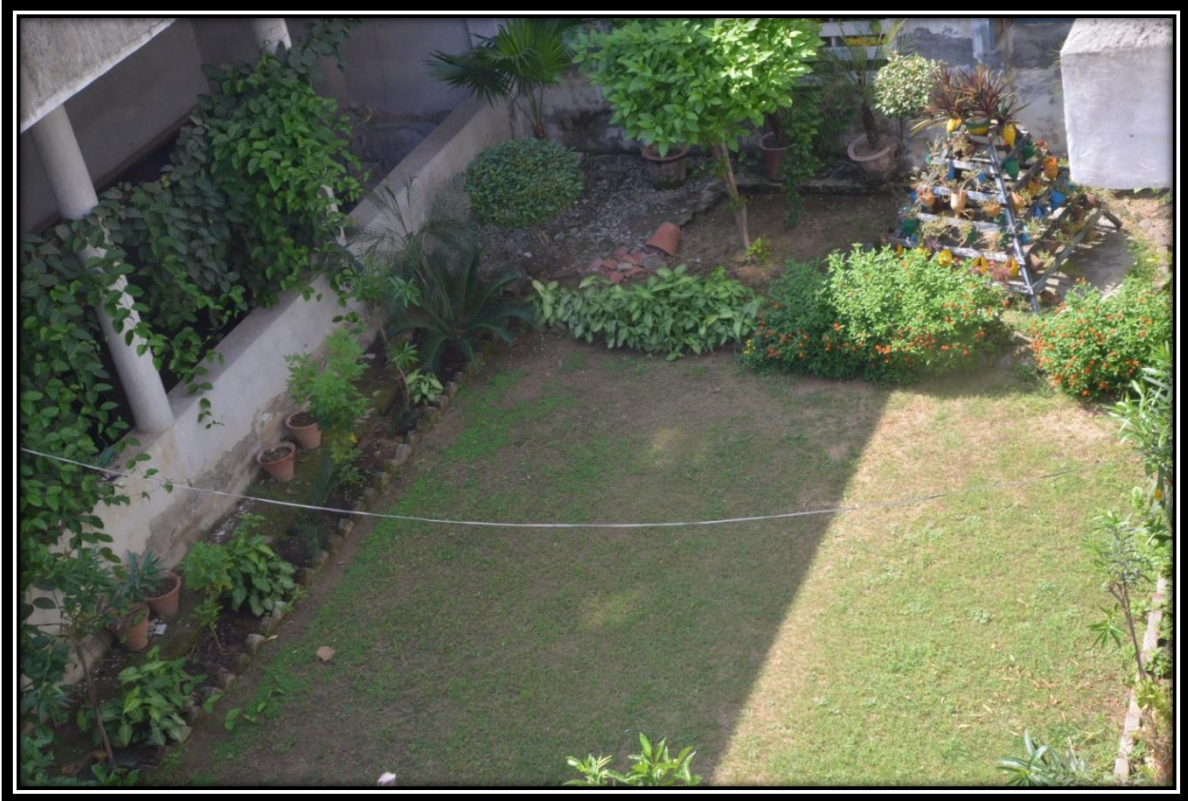
Areca Palms Planted in Recycled Tyres in Guru Nanak Bagichi.



Different Varieties of Palms Planted in Science Block Lawn.

SHRUBS

S. No.	Common Name	Botanical Name	Number
1.	Chenille plant	<i>Acalypha hispida</i>	12
2.	Indian crape myrtle	<i>Lagerstroemia indica</i>	3
3.	Double chandni	<i>Tabernaemontana divaricata</i>	13
4.	Bougainvillea	<i>Bougainvillea spectabilis</i>	3
5.	China rose	<i>Hibiscus rosa-sinensis</i>	30
6.	Orange jessamine	<i>Murraya paniculata</i>	3
7.	Single chandni	<i>Tabernaemontana divaricata</i>	2
8.	Poinsettia	<i>Euphorbia pulcherrima</i>	7
9.	Lal kaner	<i>Nerium indicum</i>	10
10.	Gaudi Chaudi	<i>Tecoma gaudichaudi</i>	6
11.	Yellow kaner	<i>Thevetia peruviana</i>	2
12.	White kaner	<i>Nerium oleander</i>	1
13.	Scrambled Egg Bush	<i>Cassia glauca</i>	4
14.	Dwarf chandni	<i>Tabernaemontana corymbosa</i>	5
15.	Harshingar	<i>Nyctanthes arbortristis</i>	2
16.	Lantana	<i>Lantana camara</i>	6
17.	Motia (Jasmine)	<i>Jasminum</i>	5
18.	King's Mantle	<i>Thunbergia erecta</i>	2
19.	Firebush	<i>Hamelia patens</i>	4
20.	Queen Sirikit	<i>Mussaenda philippica</i>	20
21.	Nisinda	<i>Vitex negundo</i>	1
22.	Chandni	<i>Tabernaemontana divaricata</i>	1



Plantation of Shrubs in the Lawn Near Parking Area.

POT PLANTS

S. No.	Common Name	Botanical Name	Number of pots
1.	Asparagus fern	<i>Asparagus aethiopicus</i>	23
2.	Boston fern	<i>Nephrolepis exaltata</i>	5
3.	Spider lily	<i>Hymenocallis littoralis</i>	1
4.	Syngonium	<i>Syngonium podophyllum</i>	64
5.	Money plant	<i>Epipremnum aureum</i>	25
6.	Ruellia	<i>Ruellia tuberosa</i>	2
7.	Crown-of-thorns	<i>Euphorbia milii</i>	13
8.	Cathedral bells	<i>Kalanchoe pinnata</i>	8
9.	Dumb canes	<i>Dieffenbachia</i>	4
10.	Turtle Vine	<i>Callisia repens</i>	7
11.	Patharchatta plant	<i>Bryophyllum pinnatum</i>	1
12.	Creeping inchplant	<i>Callisia repens</i>	9
13.	Rainbow tree	<i>Dracaena colorama</i>	5
14.	Artillery plant	<i>Pilea muscosa</i>	1
15.	Purslanes	<i>Portulaca</i>	20
16.	Brazilian snow flower	<i>Alternanthera ficoidea</i>	12
17.	Yucca	<i>Yucca</i>	2
18.	Dragon tree	<i>Dracaena spp</i>	25
19.	Jade plant	<i>Crassula ovata</i>	19
20.	Song of India	<i>Dracaena reflexa</i>	4
21.	Coleus Mix	<i>Coleus blumei</i>	2
22.	Schefflera	<i>Schefflera</i>	6
23.	Compact Dragon Tree	<i>Dracaena compacta</i>	3
24.	Wandering jew	<i>Tradescantia zebrina</i>	15
25.	Dwarf lilyturf	<i>Ophiopogon japonicus</i>	1
26.	Elephant ears	<i>Alocasia</i>	8
27.	Ornamental kale	<i>Brassica oleracea</i>	2
28.	Sadabahar	<i>Catharanthus roseus</i>	4



Beautiful Plants Planted in Science block.



Different Varieties of Plants Planted in Pots Outside Administrative Block.

CLIMBERS

S.No.	Common Name	Scientific Name	Number
1.	Violet trumpet	<i>Adenocalymma alliaceum</i>	4
2.	Chinese trumpet vine	<i>Campsis grandiflora</i>	2
3.	Golden Shower	<i>Pyrostegia venusta</i>	10
4.	Combretum comosum	<i>Combretum comosum</i>	1
5.	Flaming glorybower	<i>Clerodendrum splendens</i>	3
6.	Curtain Creeper	<i>Vernonia elaeagnifolia</i>	1



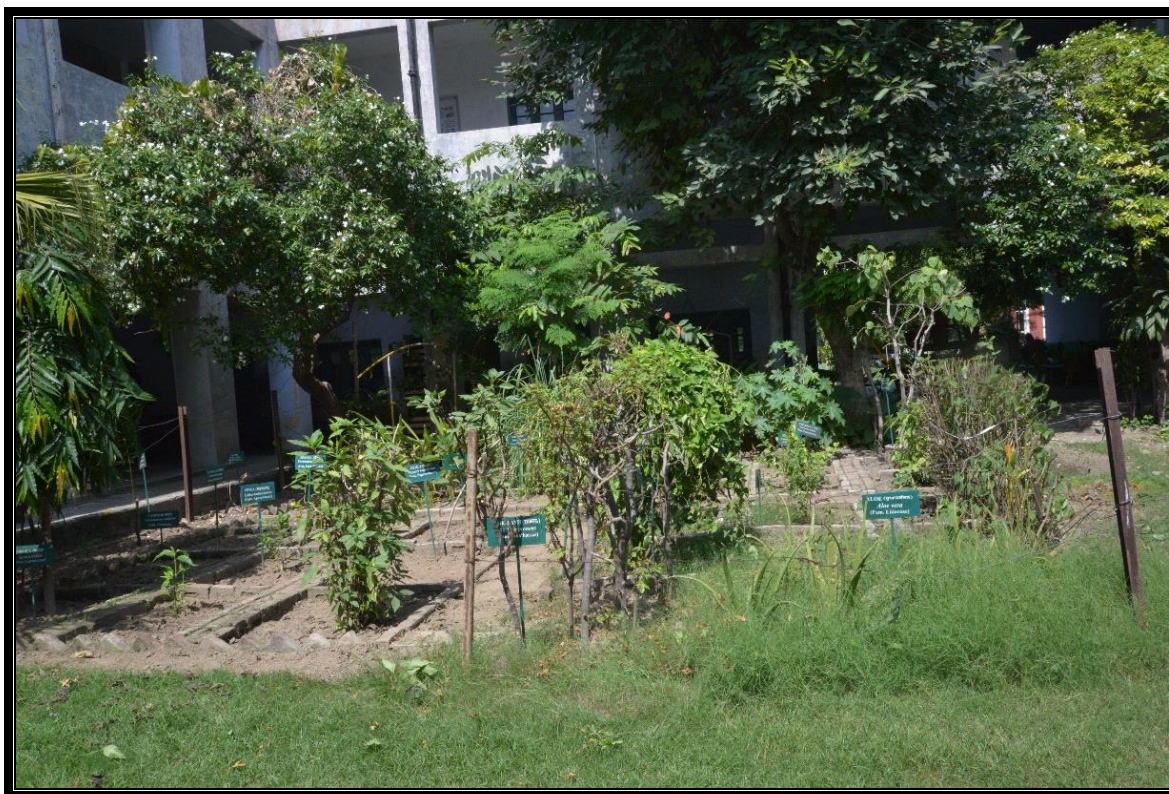
Climbers Growing in the Lawn Adjacent to Administrative Block.

OTHER PLANTS IN GARDEN

S.No.	Common Name	Scientific Name	Number
1.	Ficus tree	<i>Ficus benamina</i>	12
2.	Elephant ears	<i>Alocasia</i>	15
3.	Wandering Jew	<i>Zebrina pendula</i>	10
4.	Jersey lily	<i>Amaryllis belladonna</i>	50
5.	Ficus Panda	<i>Ficus retusa</i>	1
6.	Pleomele	<i>Dracaena reflexa</i>	12
7.	Yuccafilamantosa	<i>Yucca cylindrica</i>	20
8.	Rose	<i>Rosa</i>	30
9.	Garden croton	<i>Codiaeum variegatum</i>	15
10.	Shell Flower	<i>alpinia speciosa</i>	10
11.	Lobster claw	<i>Heliconia rostrata</i>	30
12.	Morning glory	<i>Ipomoea</i>	15
13.	Creeping daisy	<i>Wedelia trilobata</i>	
14.	Duranta goldiana	<i>Duranta goldiana</i>	10
15.	Garden Balsam	<i>Impatiens balsamina</i>	7

BOTANICAL GARDEN

S.No.	Common Name	Scientific Name
1.	Ashwagandha	<i>Withania Somnifera</i>
2.	Aloe	<i>Aloe vera</i>
3.	Vajardanti	<i>L.Barleria Prianitis</i>
4.	Ashoka	<i>Saraca Indica</i>
5.	Vinca	<i>Catharantus Roseus</i>
6.	Opium	<i>Papauu somniferrum</i>
7.	Fennel	<i>Foeniculum Vulgarae</i>
8.	Capsicum	<i>Capsicum annum</i>
9.	Camphor	<i>Cinamomum camphor</i>
10.	Ginger	<i>Zingiber officinale</i>
11.	Datura	<i>Datura stramonium</i>
12.	Mentha	<i>Mentha spicata</i>
13.	Giloe	<i>Tinospora cordifolla</i>
14.	Bael	<i>Aegle marmetos</i>
15.	Niazbo	<i>Occimum basilicum</i>
16.	Castor	<i>Ricinus communis</i>
17.	Myrobalan	<i>Terminalia nebula</i>
18.	Peepal	<i>Ficus religiosa</i>
19.	Brahmi	<i>Bacopa Monniena</i>
20.	Garlic	<i>Allium satium</i>
21.	Lemon	<i>Citrus cimon</i>
22.	Sanatvari	<i>Aspharagus racemosa</i>
23.	Neem	<i>Azadirachta indica</i>
24.	Vasaka	<i>Adhatoala vasaka</i>
25.	Dill	<i>Anethum graveolens</i>
26.	Purmeric	<i>Curcuma longa</i>
27.	Amla	<i>Embllica officinalis</i>
28.	Harar	<i>Terminalia chebula</i>
29.	Stevia	<i>Stevia rebauoliana</i>
30.	Cardamom	<i>Elettaria cardamomum</i>



Botanical Garden Inside Science Block Lawn.

GREEN PRACTICES

In addition to the above-mentioned practices, the college has also adopted the 'Green Campus' system for environmental conservation and sustainability. There are main three pillars i.e. zero environmental foot print, positive impact on occupant health and performance and 100% graduates demonstrating environmental literacy. The goal is to reduce CO₂ emission, energy and water use, while creating an atmosphere where students can learn and be healthy. For this the college has constituted certain clubs and committees namely Gurmat Sabha, Nek Chand Memorial Club, Bhagat Puran Singh Eco Club, Land beautification Committee that actively promote the various projects. Here we have summarized the work done by these clubs and committees in last five years.

GURMAT SABHA

Guru Nanak Dev Ji, founder of Sikhism and first of ten Sikh Guru's, through his teachings has always promoted the idea that love and concern for nature is part of a holistic approach to life and thus environment degradation must be avoided. To honour his vision; On 550th birth anniversary of Sri Guru Nanak Dev ji, Gurmat sabha of Gujranwala Guru Nanak Khalsa College, done a massive plantation drive by establishing a new park in the college named "*Guru Nanak Bagichi*" whose inauguration was done on 2nd November, 2019. The only aim for creating such a wonderful park with fountain was to modify and beautify the Guru Nanak Bagichi with pot plants, beautiful seasonal flowers, Avenue trees, different kinds of palms etc. to fight against pollution.





Guru Nanak Bagichi Adjacent to Gurudwara Sahib.



Inauguration of Guru Nanak Bagichi.

NEK CHAND MEMORIAL CLUB

Nek Chand Memorial Club of Gujranwala Guru Nanak Khalsa College is dedicated to modify, beautify and simplify the campus which it had been doing since 2015. Here we have summarized the work done by this club.

The concept of Best out of Waste: Nek Chand Memorial Club of Gujranwala Guru Nanak Khalsa College, Ludhiana, organized a competition based on the theme 'Beautification of the Campus'. The students brought waste bottles from their homes and painted the same with vibrant colours. Those were used to grow beautiful little flower plants in the parking area of the college. The teachers had motivated the students to participate more and more in such kind of activities.

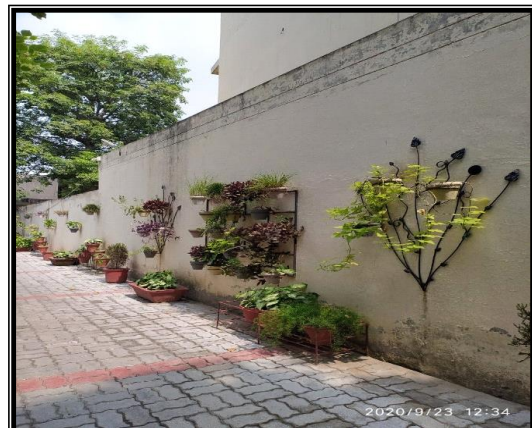






Water Bottles Are Used to Grow Beautiful Little Flower Plants in the Lawn Near Parking Area of the College.

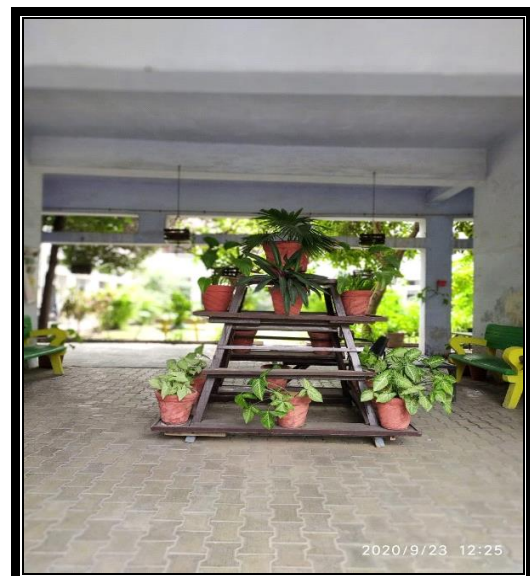
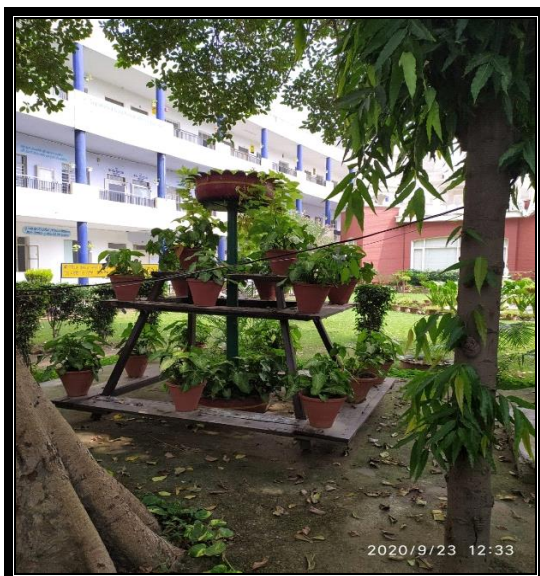
- **Used waste Iron rods to make flower-vase stands:** In this activity, the students sorted out the iron rods which could be reused and painted them. Afterwards, with the help of the carpenter of the college, they molded the rods into beautiful and attractive stand for the flower-pots. These stands were installed at various places in the college, like; the entrance wall and the Science Block. This activity had helped the students to explore their hidden talent on one hand and to beautify the campus with a sense of belongingness on the other.

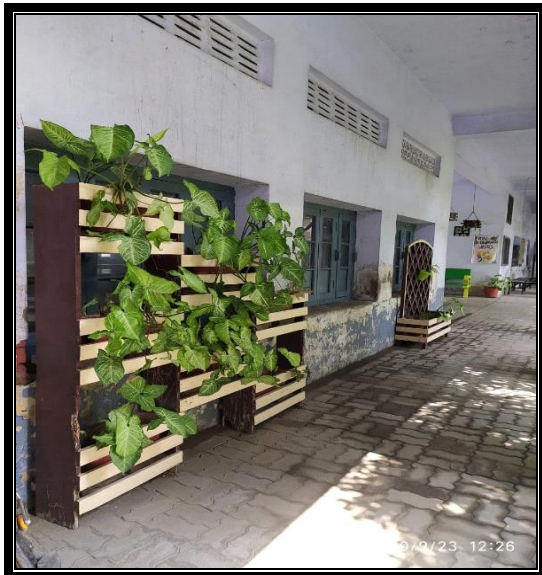




Used Waste Iron Rods to Make Flower-vase Stands.

- **Old wooden benches were used to prepare flower-vase stands:** The old and broken benches which could be reused to create flower-pots and flower-pot-stands. The newly made-up stands were installed in front of the Administrative block, main Staff room, and other significant places of the college.





Flower-vase Stands Prepared from Waste Wooden Benches.

- **Old and rusty Iron drums were installed in the campus for plantation:** Students sorted out the old and rusty drums from the college store-room to recycle. After finalizing the drums, they took all of these to the workshop of the college carpenter where he helped them out in reshaping the same. All the drums were installed at various locations of the college for plantation.



Old Rusty Iron Drums Used for Plantation.

- **Used waste wood and iron to make sanitizer Dispenser:** Nek Chand Memorial Club of Gujranwala Guru Nanak Khalsa College, Ludhiana, working laboriously to fight the COVID-19 pandemic has installed wooden and metal stands of Sanitizer Dispenser to assure the safety of all the college staff members.



Waste Wood Used to Make Sanitizer Dispenser.

BHAGAT PURAN SINGH ECO CLUB

Bhagat Puran Singh Eco Club of Gujranwala Guru Nanak Khalsa College had been active since 2015. Here we have summarized the work done by this club.

- Tree Plantation in the lawn opposite Guru Nanak Hall.



Tree Plantation in the Lawn Opposite Guru Nanak Hall.

- Installed hanging flower pots near college parking.



Hanging Flower Pots Installed Near Parking Area.

- Installed pots on pillars of Golden Jubilee Block.



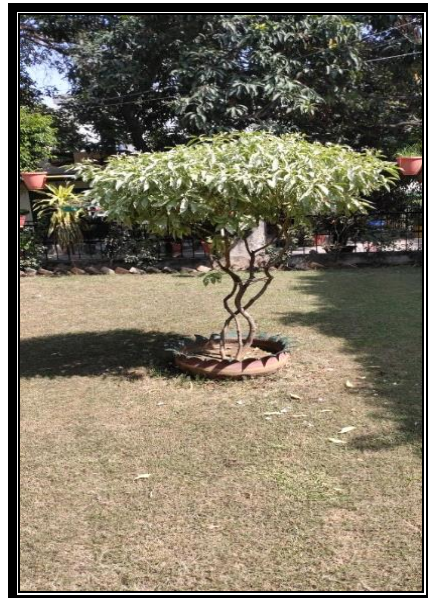
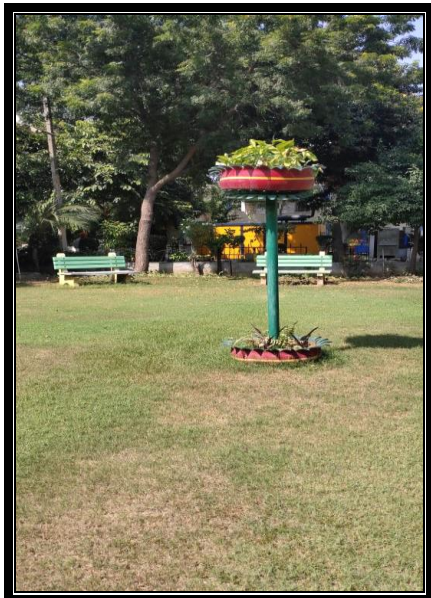
Flower Pots Installed on Pillars in Golden Jubilee Block.

- Reshaping of waste wood into pot stands.



Reshaping of Waste Wood into Pot Stands.

- Plantation Drive in the College Campus.





Discarded Tyres Were Repaired and Painted and Used Them for Plantation Purposes.

LAND BEAUTIFICATION COMMITTEE

The land beautification committee was constituted in 2015. The members this committee are responsible for overall beautification of college campus. The major areas of work are to purchase and plant all seasonal plants for pots and lawns. The committee every year do addition of new avenue trees, shrubs, climbers and many more other plants. It is the responsibility of land beautification committee to check cleanliness of all the lawns and manure needs of all greenery in the college. The nurseries of the seasonal flower plants are grown in the college.



Plantation by Land Beautification Committee at Different Locations in the Campus.



Nursery of the Seasonal Flower Plants Growing Inside the Campus.

NSS & NCC

The NSS and NCC unit of college is also involved in 'Green Campus' system for environmental conservation. For this, these units organize various activities from time to time. Some of these activities we have listed here.

- NSS & NCC cadets of GGN Khalsa College, every year organize one day camp to promote "Swachh Bharat Mission" by taking up the cleaning all lawns in campus and a park located just outside the college on Rani Jhansi Road.



One Day Camp to Promote "Swachh Bharat Mission".

- NSS unit of college has also organized a highly informative and thought-provoking lecturer on 'Kitchen Garden' on 23rd September, 2016. Dr. Sukhdip Singh Hundal, Nodal Officer, Horticulture Department, Punjab Government, delivered this lecture.

TOTAL EXPENDITURE ON GREEN INITIATIVES

Average percentage expenditure on green initiatives and waste management, excluding salary component during last five years.

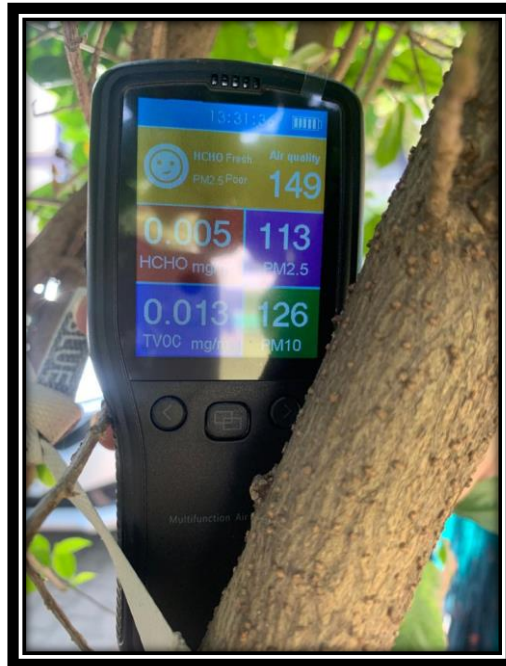
Year	Expenditure on green initiatives and waste management, excluding salary component
2015-16	6,000/-
2016-17	14,990/-
2017-18	52,260/-
2018-19	95,994/-
2019-20	2,03,000/-
Total Expenditure	3,72,244/-

- **AIR QUALITY MANAGEMENT**

Being situated in the urban area, our college is exposed to various atmospheric pollutants from vehicles as well as by other external means. Based on our calculation, the different sources of CO₂ emitted to our college are refrigerators, vehicles, air conditioners, water coolers etc. The college has taken following initiatives to make the campus eco-friendly.

1. Air quality tester meter has been installed in the campus. The air quality tester is PM2.5 detector. This air quality monitor has a built-in fan to quickly draw in ambient air to allow real time measurements. It can detect formaldehyde, TVOC, Benzene, PM2.5, PM10 and air quality. It incorporates a laser sensor to measure levels of dust particles and it works on the

principle of electrochemical semiconductor + Laser sensing to measure formaldehyde and natural/synthetic organic compound levels.



Air Quality Tester Installed Inside the Campus.

Using this air quality tester, data has been collected from both inside and outside the campus as shown in the table below. We can see that green area inside the campus have a significant impact on air quality. Among the selected pollutants, concentrations of PM_{2.5} (Fine inhalable particles, with diameter that are generally 2.5 micrometer and smaller) and PM₁₀ (inhalable particles, with diameter that are generally 10 micrometer and smaller) have witnessed maximum reduction (>41-47%) in case of PM_{2.5} and (>41-48%) in case of PM₁₀ inside the campus compared to other locations inside the city. The results demonstrated that green area inside the campus maintains fresh atmosphere and quality of air is substantially improved.

AIR QUALITY CHECK AT DIFFERENT LOCATIONS INSIDE & OUTSIDE THE CAMPUS

1.

S.No.	Location	Air Quality	PM 2.5	PM 10
1.	Guru Nanak Bagichi (Inside the Campus)	149	113	126
2.	Lawn opposite Guru Nanak Hall (Inside the Campus)	149	113	126
3.	Ghumar Mandi Market (Outside the Campus)	272	192	215
4.	Bus Stand (Outside the Campus)	300	217	243

2. All rooms are provided with large windows to let light in and air to circulate .Use of artificial lights during day time is minimal and cross ventilation of air insures a cooler indoor environment.
3. All electronic equipment's and gadgets are shut off during non-working hours.
4. All new purchases of Air-Conditioners are done ensuring high stars i.e. more than three stars. Old A.C's are attached with power saving regulators and thermo stats are set at energy conversation mode to control consumption and running cost.
5. All new purchases of T.V. are energy efficient models such as L.E.D.
6. Laser printers are placed on low power consumption functions.
7. To a large extend LED's are used inside the campus.
8. Last but not the least, above mentioned flora including plants, herbs and shrubs in our college contribute to the oxygen supply that we utilize and also consume carbon dioxide produced.

• ENERGY USE AND CONSERVATION

Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. Energy source utilized by all the departments and common facility centre is electricity only. Each department possess computers, printers, fans, plug points, tube lights, LED's, AC's, refrigerators etc. In addition to theses our college also have:

- Exhaust fans
- Hot plate
- Hot air oven
- Mike
- Bell
- Water coolers etc.

Working on eco-friendly power sources the college has taken following initiatives:

1. College has installed roof-top solar panels. This solar power plant is a leading infrastructure development program of the centenary celebrations. Some of its key features are given as:

- The capacity of this solar power plant is 70 kilowatt power which costed around 28 lakhs Indian rupees. This project includes 223 solar panels of 315 watt capacity each. There is no compromise with the quality of its major and minor equipment's such as panels belong to Vikram brand and the inverter is of Delta Company.
- This solar power plant produces approximately 160 units of electricity per day in the winter season which almost doubles in the summer season. In a simple mathematical calculation, If 10 rupees per unit of electricity cost is considered,

then it saves the electricity of rupees 1600 daily and rupees 40,000 approximately per month in this winter season, which will be double in the summer season. **In a nutshell, it saves around 7 lakh Indian rupees per year.**

- The biggest utility or advantage of this solar project is its durability and sustained efficiency which will remain unaffected for next 25 years. In addition to it, the excess power can be sold back to the PSPCL. This whole project has been handled and completed within the given time limits by Mittal Machines private limited.





Solar Panels Installed on the Roof of Science Block are Also in Use to Supply Energy.

2. Support renewable and carbon-neutral electricity options on any energy purchasing consortium, with the aim of supplying all college properties with electricity that can be attributed to renewable and carbon-neutral sources.

- **WASTE DISPOSAL MANAGEMENT**

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. and recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone.

Solid waste management

The college generally has green waste in the form of lawn and leaves, fruits and vegetable waste (peels etc.) from college canteen which is thrown in separate pits and used for **vermicomposting**.



Vermicomposting Unit Backside Science Block.

- Solid waste is segregated as biodegradable and non-biodegradable as shown in picture below.



Segregation of Waste at Collection Source.

- Non-biodegradable in the form of plastic bottle's is used to turn into beautiful flower vase as mentioned and shown in work done by Nek Chand Memorial Club of college. The plastic waste which cannot be transformed sent for recycling through junk dealer.
- The college has solid waste disposal bins in each block which is collected by concerned employees daily for its disposal.



Waste Collection Bins.

- Use of pesticides and harmful chemical fertilizers is replaced by organic manure produced by green waste.
- Polythene bags usage is discouraged.

Liquid waste management

- Organic liquid waste generated from canteen etc. is discharged into sewage system.
- Chemical waste disposal is a major issue. This project is in the initial stage. It is planned to collect liquid waste in pits outside the laboratories and do necessary actions to make the liquid less toxic.

- **E-WASTE MANAGEMENT**

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. This makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

Observations: E-waste generated in the campus is very less in quantity. The cartridges of laser printers are refilled outside the college campus. Administration conducts the awareness programs regarding E-waste Management with the help of various departments. The E- waste and defective item from computer laboratory is being stored properly. The institution has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

Recommendations: Recycle or safely dispose of white goods, computers and electrical appliances. Use reusable resources and containers and avoid unnecessary packaging where possible. Always purchase recycled resources where these are both suitable and available.

- **WATER MANAGEMENT**

This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures. A water audit is an on-site survey and assessment to determine the water use and hence improving the efficiency of its use.

Gujranwala Guru Nanak Khalsa College has started modern method of irrigation for watering vertical gardens in the college. In this method, low volume irrigation with low flow of water with lower pressure is used. In this method we have used pipes or tubes, which delivers water directly

to all the pots/bottles of vertical garden avoiding wastage of water through evaporation and flooding.

Micro irrigation system ensure uniform distribution of water. According to the experts, micro irrigation compared to other irrigation methods uses between 30-50% less water.

In our college this system is installed near the Gurudwara Sahib building and on the walls of chemistry lab. This system not only conserve our very precious natural resource such as water; but it will also serve as a demonstration unit to conserve water for students, staff and other visitors in the college.





Micro Irrigation System Installed Near the Gurudwara Sahib Building and on the Walls of Chemistry Lab.

For hygienic drinking water, RO, water filters and water dispensers are installed in each block. In order to provide portable drinking water there are 4 RO's, 2 water filters and 5 water dispensers at various locations in the campus. The college inspects the working of filters and suitability of quality of water is verified from time to time.

CONCLUSIONS

The mission, vision and objective of GGN Khalsa College is to love and show concern for nature is done by doing significant work of its management, staff and students. The college is doing 'Green Practices' within and outside the college campus to make whole environment eco-friendly.

The awareness about the needs to protect the environment and to promote love for the surrounding is done by organizing different seminars, symposiums and quiz competitions etc.

For the conservation of conventional source of energy (electricity) solar panels are installed. To create awareness about air pollution, Air quality tester is used, to monitor the level of CO₂/CO, formaldehyde, and volatile organic compounds in the air. The green waste collected from all the lawns in the form of dead leaves and plants; fruits and vegetable peels collected from college canteen, thrown in separated bins for preparing Vermicompost.

Biodegradable waste, glass, plastic etc. is channelized in better service through recycling with the help of different clubs of the college. For water conservation; water splinkers in lawns are used and micro irrigation system is used in vertical garden is noteworthy.

As it is the need of the present hour that we should have to conserve all natural resources and manage waste materials. We are committed to implement new and latest techniques to further glorify the campus of Gujranwala Guru Nanak Khalsa College.

ACKNOWLEDGEMENT

We would like to thank our Principal, Dr. Arvinder Singh for his consent to conduct this audit. We would like to sincerely thank all the departments, students, teaching and non-teaching staff for their kind co-operation with us during this survey. We would also like to specially thank the laboratory assistants who helped us a lot in furnishing this information.

Further we hope, this will boost the new generation to take care of Environment and propagate these views for many generations to come.

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