Green Audit Report

H.N.B. Garhwal University
(A central university)
Srinagar Garhwal

Prepared by
HNBGU Green Audit Committee

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About the University

Hemwati Nandan Bahuguna Garhwal University was established as a State University vide U.P. State Government notification no. (10)/ (865)/15/ (75)(85)/64 dated 23 November 1973. It has a rare distinction of taking birth through a powerful popular movement during early seventies in the last century. This movement symbolized the hopes and aspirations of the masses of the region of Garhwal for the development through higher education. The people of this mountainous region agitated for opening a university at this small but historic semi-rural town of Srinagar. It was an expression of the quest for empowering their future generations for overcoming endemic economic and social backwardness, geographic and environmental constraints.

The university was converted to a Central University on 15th January 2009 by an Act of Parliament i.e., the Central Universities Act 2009. The University, thus been entrusted with new responsibilities to guide its students, faculty and all other stakeholders to achieve excellence in academics and strive for all round development of the students. Since its inception, the University has shown commitment towards regional and community development which is inherent in its teaching courses, research agenda and other outreach and extension initiatives.

The University has three Campuses distantly located from each other - Birla Campus, Srinagar Garhwal with its extension at Chauras Campus, B. Gopal Reddy (BGR) Campus, Pauri and Swami Ram Teerth (SRT) Campus, Badshahithaul, Tehri.

Prof. Annpurna Nautiyal

Foreword

The "Green Campus" concept provides an opportunity to educational institutions particularly Universities to take the lead in rethinking its environmental culture and developing new paradigms for addressing issues of local and regional importance. A green campus is a place where environmentally responsible practices and education go hand-in-hand leading to environmentally responsible students and citizens those set examples for rest of the society. This also requires peer learning, earning-through- practices and inclusive knowledge use, which form the basis for bringing transformative changes in the overall quality of surrounding environment.

The development of green campus is geared towards an overall goal that demonstrates academic commitment and wise planning reflected in an environment-friendly campus administration different from other institutions by performing green functions linked with the concept of sustainable development goals (SDGs). Greening the campus is about discarding unsustainable practices and ushering into positive changes. Many of these changes address the issues such as energy use and conservation, wasteland land restoration through ecosystem approaches, air quality maintenance, integrated solid waste management, reducing paper waste, roof-top rain water harvesting its purification and use, ground and waste water conservation/management, procuring environment-friendly products, use and creation of environment-friendly facilities and environmentally sound education etc. The concept of 4 R's (reuse, reduce, recycle and regenerate) is applied in every actions and programmes of the University colleges and affiliate bodies. Inculcating a concept of reducing the ecological footprints should be the overall aim of such an effort.

The green campus initiatives taken by the HNB Garhwal University has been advocated among the students, faculty and other staff for making the University Campuses green and environment-friendly that leaves a permanent imprint into the young minds, particularly the students. However, for successful implementation of the green campus approaches and practices determination and long-term commitment on the part of entire green campus community is required that includes students, researchers, faculty and policy planners of the University. I congratulate the team of authors of this document and hope that this document will serve as a benchmark to support the design of successful actions and strategies for maintaining sustainable, eco-friendly and smart green campuses in this University and the regional institutions as well.

Professor Annpurna Nautiyal,
Vice Chancellor,
HNBGU

Preface

The United Nations Decade on Ecosystem Restoration (2021– 2030) calls for ramping up ecological restoration to save mankind from intertwined problems of climate change, biodiversity loss, poverty, and inequalities. Life on earth is deteriorating fast worldwide, and it is clear that without harnessing the potential of natural resources in a sustainable way it is not possible to moderate climate extremes, reverse biodiversity loss and control air and water pollution and maintain the overall quality of our mother earth. Ecosystem restoration and other eco- friendly solutions can deliver desirable results to improve the environmental health and human well-being.

In this regard the Green Campus concept provides an opportunity to educational institutions, particularly universities to take the lead in rethinking its environment-friendly culture and developing new paradigms to offer sustainable solutions locally those have regional, national and even global implications. The concept of green campus development, in general, refers to development that pays attention to and takes into account environmental dimensions in overall activities of the Universities and creating an educational atmosphere blended with environmental consciousness among the students and other stakeholders.

The layout and condition of campus facilities and infrastructure that promotes, energy use and conservation, air and water quality maintenance, regulation of micro-climate within the campus, integrated solid waste management including paper waste from offices, air and water quality upkeep, use and efficient conservation and management of rain and waste water, purchase of environment-friendly supplies, use and creation of environmentally-friendly transportation facilities, and environmental education are some of the primary criteria for creating an environmentally-friendly campus.

The green campus initiatives taken by the HNBGU and scope for improvement has been advocated among the students, faculty and other staff of the University for making the University campus green and environment-friendly. However, for successful implementation of the green campus approaches, the strategies should be location-specific, climate resilient and sustainable in long-term, which in turn is dependent on a multidisciplinary interaction between the students, researchers, faculties, policy planners of the university and other stakeholders. Thus, the concept of green campuses can play a major role in crafting a vision of environmental consciousness among various sectors of the University community ecosystem leading to environmentally responsible citizens of future

Team Members

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Prof. Munesh Kumar, Member

Dr.VijayKant Purohit, Member

Mr. M.P. Dobhal, Member

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1. INTRODUCTION

The green audit aims to analyze environmental practices within and outside the university campuses, which will have an impact on the eco-friendly atmosphere. Green audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of university environment. It was initiated with the motive of inspecting the effort within the institutions whose exercises can cause threat to the health of inhabitants and the environment. Through the green audit, a direction as how to improvethe structure of environment and there are include several factors that have determined the growth of carried out the green audit.

NEED FOR GREEN AUDITING

Green auditing is the process of identifying and determining whether institutions practices are eco-friendly and sustainable. Traditionally, we are good and efficient users of natural resources. But over the period of time excess use of resources like energy, water, are become habitual for everyone especially, in common areas. Now, it is necessary to check whether our processes are consuming more than required resources? Whether we are handling resources carefully? Green audit regulates all such practices and gives an efficient way of natural resource utilization. In the era of climate change and resource depletion it is necessary to verify the processes and convert it in to green and clean one. Green audit provides an approach for it. Italso increases overall consciousness among the people working in institution towards an environment.

GOALS OF GREEN AUDIT

University has conducted a green audit with specific goals as:

1. Identification and documentation of green practices followed by university.
2. Identify strength and weakness in green practices.
3. Analyze and suggest solution for problems identified.

4. Assess facility of different types of waste management.

5. Increase environmental awareness throughout campus

6. Identify and assess environmental risk.
7. Motivates staff for optimized sustainable use of available resources.

8. The long-term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issue before they become problem.

OBJECTIVES OF GREEN AUDIT

1. To examine the current practices, which can impact on environment such as of resource utilization, wastemanagement etc.
2. To identify and analyze significant environmental issues.

3. Setup goal, vision, and mission for green practices in campus.

4. Establish and implement Environment Management in various departments.

5. Continuous assessment for betterment in performance in green auditing.

BENEFITS OF GREEN AUDIT TO EDUCATIONAL INSTITUTIONS

There are many advantages of green audit to an Educational Institute:

1. It would help to protect the environment in and around the campus.

2. Recognize the cost saving methods through waste minimization and energy conservation.

3. Empower the organization to frame a better environmental performance.

4. It portrays good image of institution through its clean and green campus.

Finally, it will help to build positive impression for through green initiatives the upcoming NAAC visit.

OBJECTIVE AND SCOPE

The broad aims/benefits of the eco-auditing system would be

- Environmental education through systematic environmental management approach
- Improving environmental standards
- Benchmarking for environmental protection initiatives
- Sustainable use of natural resource in the campus.
- Financial savings through a reduction in resource use
- Curriculum enrichment through practical experience
- Development of ownership, personal and social responsibility for the University campus and its environment.
- Enhancement of College profile
- Developing an environmental ethic and value systems in young people

2. EXECUTIVE SUMMARY

An environmental audit is a snapshot in time, in which one assesses campus performance in complying with applicable environmental laws and regulations. Though a helpful benchmark, the audit almost immediately becomes outdated unless there is some mechanism in place to continue the effort of monitoring environmental compliance.

This audit report contains observations and recommendations for improvement of environmental consciousness.

3. HNBGU INFRASTRUCTURE

Biodiversity of the University

The University campus, HNB Garhwal University is rich in floral diversity which mainly includes a variety of species of trees, shrubs, herbs, climbers and others including important faunal species such as reptile, butterfly, insects, spider and birds, etc. In different locations (i.e., Forestry Research Centre (FRC), High Altitude Plant Physiology Research Centre (HAPPRC), Birla Campus, Chitra garden, Teacher's Colony, Girls Hostels, Chauras Campus) of the University (including residential area of faculty & staff) a total of 5375 trees has been reported from the campus. Among the campus locations, the dominant trees reported were *Dalbergia sissoo, Albizzia lebbeck, Grevillea robusta, Leucaena leucocephala, Mangifera indica, Melia azedarach, Polyalthia longifolia, Terminalia ballerica etc.* The details of trees reported from the campus locations are shown in **Table-1. Besides, 855 tree species has been reported from the Pauri campus and about 300 tree species reported from the Tehri campus of the HNBGU (Pl. see annexure no. 9 & 10).**

Table-1. Diversity of trees planted/growing naturally in the University campus

SN	Scientific name	Common Name	Chauras	Girl's hostel	FRC	HAPPRC	CHITRA
1.	*Acacia catechu*	Khair	4	-	-	14	-
2.	*Actinidia deliciosa*	Kiwi	-	-	-	-	25
3.	*Adina cordifolia*	Karma	1	-	-	30	-
4.	*Aegle marmelos*	Bael	13	-	-	-	-
5.	*Aesculus indica*	Himalyan chestnut	-	-	-	1	-
6.	*Aesculus carnea*	Red horse-Chestnut	1	-		-	-
7.	*Albizia lebbeck*	Sirish	59	-	183	33	-
8.	*Albizia procera*	White siris	28	2	48	-	-
9.	*Albizia stipulate*	Shirish	-	-	-	25	-
10.	*Alstonia scholaris*	Indian pulai	2	-		-	-
11.	*Araucaria columnaris*	Monkey puzzle	-	-	-	4	-
12.	*Artocarpus heterophyllus*	Kathal	4	-	1	-	5
13.	*Azadiracta indica*	Neem	8	2	-	-	-
14.	*Bahuniavahlii*	Maloo	-	-	-	-	1
15.	*Bahunia variegate*	Gural	28	2	7	27	-
16.	*Bassia butyracea*	Chiuri	-	-	-	37	-
17.	*Biontaorianteris*	Morpankhi	36	3		-	-
18.	*Bombax ceiba*	Semal	14	-	49	15	-
19.	*Bougainvillea glabra*	Bougainvillea	-	-	-	1	-
20.	*Broussonetiapapyrifera*	Paper mulberry	-	-	-	33	-
21.	*Callistemon citrinus*	Lemon bottlebrush	27	-	-	-	-
22.	*Caryota urens*	Fishtail palm	9	-	-	-	-
23.	*Casia fistula*	Amltas	15	-	-	1	-
24.	*Celtis australis*	Kharik	-	-	-	36	34
25.	*Cinnamomum tamala*	Tejpat	-	-	-	16	120
26.	*Citrus limon*	Nimbu/ Lemon	-	-	-	-	32
27.	*Citrus medica*	Fingers citron	1	-	-	-	-
28.	*Citrus sinensis*	Malta	-	-	-	4	26
29.	*Cordia myxa*	Lasoda	-	-	-	3	5
30.	*Cupressus torulosa*	Surai	-	-	-	10	-
31.	*Dalbergia sissoo*	Shishum	156	-	136	34	-
32.	*Delonix regia*	Gulmohar	6	3	-	-	-
33.	*Dendrocalamusstrictus*	Bans	-	-	-	-	13
34.	*Diospyros kaki*	Persimmon	-	-	-	-	5
35.	*Durantaerecta*	Duranta	-	-	-	5	-
36.	*Elaeocarpus ganitrus*	Rudraksha	-	-	-	1	2
37.	*Emlicaofficianlis*	Amla	-	2	-	-	-
38.	*Eriobotrya japonica*	Loquat	-	-	-	3	6
39.	*Ficus auriculata*	Timla	-		-	11	-
40.	*Ficus bengalensis*	Bargad	-		-	1	-
41.	*Ficus benjamina*	Weeping fig	3	-	-	-	-
42.	*Ficus carica*	Bedu	4	-	-	-	-
43.	*Ficus elastic*	Rubber plant	-	-	-	2	-
44.	*Ficus semicordata*	Khaina	-	-	-	2	1
45.	*Ficus glomerata*	Gular	-	-	-	8	-
46.	*Ficus palmate*	Bedu	-	-	-	2	-
47.	*Ficus racemosa*	Anjir	-	-	-	3	2
48.	*Ficus religiosa*	Pipal	-	-	-	1	2
49.	*Gmelina arborea*	Maliana	9	-	-	-	-
50.	*Grevillea robusta*	Silver oak	38	1	24	44	18
51.	*Grewia optiva*	Bhimal	-	-	-	12	16
52.	*Hibiscus elatus*	Mahoe	-	-	-	6	-
53.	*Hibiscus rosasinensis*	Gudhal	-	-	-	2	-
54.	*Holoptelea integrifolia*	Chilbil	28	-	-	1	-
55.	*Jacaranda mimosifolia*	Jacaranda	38	-	-	38	94

56.	*Jatropha curcas*	Physic nut	1	-	-	-	-
57.	*Lagerstroemia indica*	Crape myrtle	-	-	-	21	-
58.	*Lerchialonigenosa*	Lambpatya	-	-	-	-	8
59.	*Leucaena leucocephala*	Subabul	59	-	38	-	-
60.	*Litchi chinensis*	Litchi	-	-	-	-	19
61.	*Livistona chinensis*	Fountain palm	-	-		6	-
62.	*Mallotusphilippinensis*	Kamala (Shendri)	19			15	-
63.	*Malus domestica*	Apple	-	-	-	-	180
64.	*Mangifera indica*	Aam	49	5	16	12	24
65.	*Melia azedarach*	Dainkan	67	8	35	26	180
66.	*Melia dubia*	Malabar Neem	8	-	-	-	-
67.	*Morus alba*	Mulberry	16	7	9	9	594
68.	*Myrica esculenta*	Kafal	-	-	-	1	-
69.	*Neolisteacuipala*	Neoistea	-	-	-	42	-
70.	*Nerium oleander*	Kaner	-	-	-	1	-
71.	*Oroxylum indicum*	Midnight Horror	1	-	-	-	-
72.	*Ougeiniadelbergiodes*	Sandan	-	-	-	11	10
73.	*Paulownia elongata*	Empress tree	4	-	-	-	-
74.	*Phyllanthus emblica*	Amla	53	-	-	2	70
75.	*Pinus roxburghii*	Chir-pine	5	-	-	34	-
76.	*Pisidium guajava*	Guava	4	2	8	1	34
77.	*Polyalthia longifolia*	Palm	113	7	-	-	-
78.	*Pongamia pinnata*	Karanja	23		-	11	-
79.	*Prunus armeniaca*	Apricot	-	-	-	-	16
80.	*Prunus cerasoides*	Padam	11		-	27	5
81.	*Prunus domestica*	Plum	-	-	-	-	45
82.	*Prunus persica*	Peach	31		-	16	-
83.	*Punica granatum*	Anar	-	-	-	-	18
84.	*Pyrus pashia*	Wild pear	23		-	21	10
85.	*Quercus glauca*	Falyant	-		-	25	3
86.	*Quercus leucotrichophora*	Oak	-		-	28	18
87.	*Quercus serrata*	Oak	-		-	15	4
88.	*Roystonea regia*	Florida Royal Palm	26	-	-	-	-
89.	*Santalum album,*	Sandalwood	-		-	12	-
90.	*Sapindusmukorossi*	Reetha	6		-	9	34
91.	*Syzygiumcumini*	Jamun	13	-	-	23	600
92.	*Tecoma stans*	Trumpet bush	8	10	-	-	-
93.	*Tectona grandis*	Sagan	3	-	-	-	-
94.	*Terminalia ballerica*	Bahera	42	-	39	-	14
95.	*Terminalia chebula*	Harred	-	-	25	-	28
96.	*Toona ciliate*	Toon	14	1	-	34	22
97.	*Vachellianilutica*	Babool	-	-	-	2	-
98.	*Zanthoxylumarmatum*	Timru	-	-	-	11	7
	TOTAL		**1131**	**55**	**618**	**881**	**2330**

Wild life: The wildlife frequently spotted and reported from the different locations of the campus includes Leopard, Jacal, rabbit, wild cock, Wild reptile (Gula), Monkey, etc. The all three campuses are also rich in bird diversity (Avi-fauna) and about more than 35 bird species have been reported from Chauras campus, 82 bird's species from Pauri campus and few bird species from Tehri campus (Table-2 and Figure 1).

Pauri (BGR) campus




Tehri (SRT) campus


Table-2 Bird species (Avi-fauna) identified and documented from the University Green campus

S.No.	English Name	Zoological Name	Hindi Name
1.	Jungle Bush Quil	*Perdieula asiatica*	जंगली लवा
2.	Black francolin	*Fracolinus francolinus*	काला तीतर
3.	Chukar	*Alectiris chukar*	चकोर
4.	Kalij pheasant	*Lophura leucomelanous*	सफेद चोरी कलीज
5.	Grey-headed woodpecker	*Picus canus*	सीलेटी सिर कठफोड़ा
6.	Himalayan Flameback	*Dinopium shorii*	हिमालायी अंगारा कठफोड़ा
7.	Great Barbet	*Megalaima virens*	त्रिहों बसंथा
8.	Blue Throated Barbet	*Megalaima asiatica*	नीलकण्ठ बसंथा
9.	Common Hoopoe	*Upupa epops*	हुदहुद
10.	Green Bee-eater	*Merops orientalis*	हरा पतरंग
11.	Rose-ringed Parakeet	*Psittacula krameri*	सामान्य तोता
12.	Jungle Owlet	*Glaucidium radiatum*	जंगली डुंडुल
13.	Rock Pigeon	*Columba livia*	सामान्य कबूतर
14.	Spotted Dove	*Streptopelia chinesis*	चितरोख फाखता
15.	Egyptian vulture	*Neophron percnopterus*	सफेद गिद्द
16.	Shikra	*Accipiter badius*	शिकरा
17.	Steppe Eagle	*Aquila nipalensis*	रगड़ ऊकाब
18.	Black Kite	*Milvus migrans*	सामान्य चील
19.	Long-tailed Shrike	*Lanius schach*	लंब पूँछ लहतोरा
20.	Red-billed Blue Magpie	*Urocissa erythroryncha*	लाल चोंच लमपूछिया
21.	Long-tailed Minivet	*Pericrocotus ethologen*	छोटा पहाड़ी राजालाल
22.	Black Drongo	*Dicrurus macrocerus*	सामान्य भुजंगा
23.	Oriental Magpie Robin	*Copsychus saularis*	दयाल
24.	Indian Robin	*Saxicoloides fulicata*	कलचूरी
25.	Grey Bushchat	*Saxieola ferrea*	सुरमई झाड़ी पिद्दा
26.	Common Myna	*Acridotheres tristis*	देसी मैना
27.	Great Til	*Parus major*	सिलेरी राम गंगरा
28.	Himalayan Bulbul	*Pycnonotus leucogenys*	हिमालायी बुलबुल
29.	Red-vented Bulbul	*Pcynonotus cafer*	गुलदूम बुलबुल
30.	Streaked langhingthrush	*Garrulax lineatus*	मूस चिलचिल
31.	Purple sunbird	*Nectarisia asiatica*	बैंगनी शकरखोरा
32.	Crimson sunbird	*Aethopyga siparaja*	सिपराजा शकरखोरा
33.	House sparrow	*Passer domesticus*	घरेलू गौरैया
34.	Russet Sparrow	*Passer rulilans*	लाल गौरैया
35.	Scaly-breasted munia	*Lonchura punctilata*	चित्ती मुनिया

(Source: Dr B.S. Bhandari, Department of Botany, HNBGU).


HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY, SRINAGAR (GARHWAL)
Egyptian Vulture (Neophron percnopterus)
Black Kite (Milvus migrans)
Eurasian Collared Dove (Streptopelia decaocto)
Crested Serpent Eagle (Spilornis cheela)
Crested Kingfisher (Megaceryle lugubris)
Black Francolin (Francolinus francolinus)
Black-shouldered Kite (Elanus caeruleus)
Great Bee-eater (Merops orientalis)
Blue Rock Thrush (Monticola solitarius)
Purple Sunbird Male (Nectarinia asiatica)
Streaked Laughingthrush (Garrulax lineatus)
Wallcreeper (Tichodroma muraria)
Common Kingfisher (Alcedo atthis)
Olive-backed Pipit (Anthus hodgsoni)
Great Tit (Parus major)
Coppersmith Barbet (Megalaima haemacephala)
Oriental Magpie Robin (Copsychus saularis)
Oriental White-eye (Zosterops palpebrosus)
Blue whistling Thrush (Myophonus caeruleus)

Estimation of the Carbon storage (carbon sink) in the University Campus

Among the locations in the University campus, the trees individuals, their biomass and carbon stock have been estimated & presented in the Table-3.

Table-3 Estimation of tree biomass and carbon storage in the University campus

Location	No. of Tree species	Total No. of trees	Total Biomass (ton)	Total Carbon (ton)	Total Carbon price (Rs. lakh)/year.	*Carbon stock (ton/year)
Chauras Campus	39	1131	249.15	**124.57**	**6.85**	7.47
HAPPRC	62	881	150.67	**75.33**	**4.14**	5.82
Teacher Colony	17	277	125.06	**62.53**	**3.43**	1.83
FRC	13	618	124.61	**62.30**	**3.42**	4.10
Birla Campus	14	83	28.07	**14.03**	**0.77**	0.54
Girl's hostel	14	55	14.25	**7.12**	**0.39**	0.36
CHITRA*	43	2330	-	-	-	-
BGR campus, Pauri	37	855	-	-	**4.15**	5.84
SRT campus, Tehri	20	300			**3.80**	2.05
Total		**5375**	**691.81**	**345.88**	**26.97**	**28.01**

***Source: Low carbon lifestyles. 2010. CEE Delhi, MEF&CC (Govt. of India), GEF & UNDP. (www.ceeindia.org; www.moe&fcc.nic.in) (One tree can sequester anywhere between 3.66* to 10 kg of carbon dioxide every year).**

Since the plantation activities in Chitra garden were carried out very recently between 2020 to 2022 where a total of 2330 plants of different species (medicinal and aromatic, horticultural and multipurpose species) were planted and therefore, being a young plantation of two-three years, it was not considered for carbon stock estimation.

The carbon stock among the locations was reported maximum in the Chauras campus (7.47 ton /year) because of higher number of trees and biomass followed by HAPPRC (5.82 ton/year), Teachers colony, FRC, Birla campus and the minimum reported in Girl's hostel (0.36 ton/year). The carbon stock estimated about 5.84 and 2.05 respectively from the BGR and SRT campuses. The total carbon stock of all the locations and the campuses is reported about 28.01 ton/year which is equivalent to Rs.26.97 lakhs/year (Table-3).

Table-4 soil properties and soil carbon storage in the University campus

pH (1:2.5)	WHC (%)	BD (g cm^{-3})	SOC (%)	SOC (t $/ha^{-1}$)
6.8	31.53	1.38	0.86	**23.28**

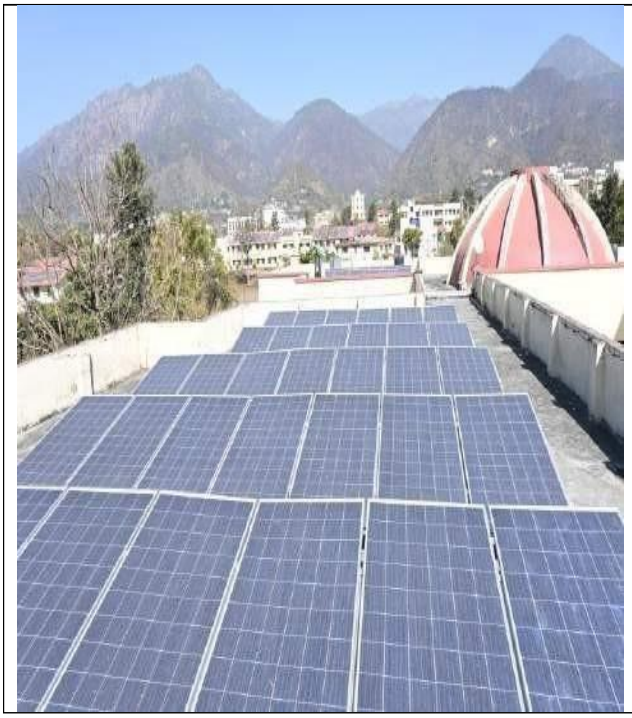
Among the soil properties, pH of soil reported slightly acidic (6.8) in nature, which is good for growing diverse plant species in the campus. Water holding capacity of soil showed its poor water retention capacity due to presence of large amount of sand & gravel and its porous nature. The bulk density of soil showed high compactness of soil. The soil organic carbon was reported 0.86% **(23.28 ton/ha)** which is quite poor and more enrichment of soil is required to improve the status of organic matter (Table-4).

Harnessing solar energy into electricity

Solar energy is radiant light and heat from the Sun that is harnessed using a range of technologies such as solar power to generate electricity, solar thermal energy (including solar water heating), and solar architecture. Solar energy based decentralized and distributed applications have benefited millions of people in urban, semi urban, and rural landscapes in India by meeting their cooking, lighting and other energy needs in an environment friendly manner.

University has installed Solar panels to harness the solar energy in to electricity at Srinagar, Chauras and Tehri campuses. Besides, the solar heaters for water heating were installed in most of the Hostels of the University which help in reducing the dependency on electricity and consequently reducing the cost of electricity bills.

The solar panel installed in the rooftops of the buildings of different departments in three campuses (Tehri campus, Birla campus Srinagar and Chauras) generate about a total of 804421-unit (kWh) which is directly transmitted to the national grid. (For further detail please see the annexure 1,2,3, & 4).



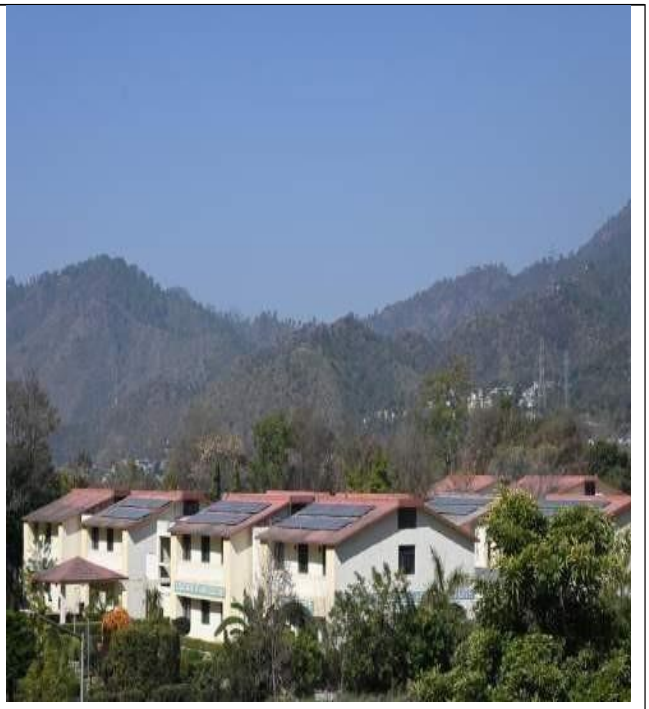



Table-4. Detail of electricity production from solar panel installed at three campuses (Tehri, Birla campus, Srinagar & Chauras)

S.No.	Campus	Name of Building	Unit (in kWh)
1.	Tehri campus (28/08/2021) to 30/11/2022	Canteen area	33494.00
		Girls Hostel	
		Building of law	
2.	Srinagar campus 15/01/2022 to 02/12/2022	Admin Building	243893.00
		RC Building	
		School of Social Science	
3.	Chauras campus 15/01/2022 to 07/12/2022	Horticulture	527034.00
		Museum Building	
		Girls Hostel	
		Boys Hostel	
		Pharmaceutical Science Building	
		School of Commerce Building	
		Mass Communication	
		Engineering Building	
		Computer Science Building	
		Tourism Building	
Grand total			**804421/=00**

Solid waste management

Waste, in simple terms, is any material that is no longer useful to us. It is what we discard or throw away after we have no use for it anymore. The waste mostly comes from classrooms, offices, laboratories, hostel kitchen/canteen, and school grounds. Different areas generate different kinds of waste. Solid wastes are generally of two kinds: (a) degradable organic matter (such as food waste, plant litter, cloth, paper, excreta, etc.) and (b) non-degradable matter (both mineral matter and organic matter) such as construction waste, metal cans, plastic, polythene, glass, etc.). The scavenger animals, fungi and bacteria can utilize and break down only the degradable organic matter into simple substances that return for nature's cycling. The non-degradable wastes accumulate on the land surface, and usually provide refuges to disease-causing and harmful organisms.

Waste is such a huge problem because we do not manage the waste we create. To begin with, it is a nuisance, an environmental hazard, and adversely affects green campus and surrounding natural environment. The sustainable solution to address the issue of waste is to begin by reducing waste in the first place, and forming new attitudes and habits regarding waste generation, management and disposal. In this regard we are creating awareness among the students to understand various aspects of waste and its management, and the necessary individual and collective efforts and actions needed in dealing with waste in campus and outside the campus.

Every department in the university have separate disposal bins for different kinds of wastes and placed at the proper location. In most of the places of the university campus as well as hostel kitchens/ canteen or other important places the waste generated usually segregated at the source into biodegradable and non-biodegradable in the disposal bins and further disposed properly at the required sites for the decomposition (bio-compost pits used for making manure) where signed board placed for the final disposal (Figs on page No. 23 & 24).

Water utilization, conservation and management

Water plays a key role in shaping the land surface and regulating climate, and in the process of determining human civilization across the world. Water is important for human and wildlife. It is used in homes, agriculture, industries, for generating hydropower and many other purposes. It plays an important role in human health and sanitation. The total quantity of water available to us on this planet has remained constant. Much of this water has remained locked up in the oceans as saline water. The usable water which is the fresh water, is only a small fraction of the total pool. This comes largely in the form of rain, which gets stored in underground natural reservoirs, or stored aboveground as snow in the glaciers or in the mountain peaks, natural lakes and rivers/stream, or that stored for immediate use in human -managed ponds and wells are other sources available to us. Freshwater is what is available for human use in a broad sense, what is accessible to a given community is even more limited arising out of a variety of local circumstances. Unsustainable extraction of water and unscientific management practices is the root cause of depletion of the water resources.

It is important for us to become aware of this precious natural resource and therefore, students would understand and appreciate the interlinked dimensions of water which include access to water; its availability; its effect on health; its importance in sustainable development; to the significance of conserving it.

In the university particularly at Chauras campus we have installed and properly maintained the safe drinking water facilities at six places (water purifier). Besides, efforts have been made to harvest rain water from the rooftops or the ground by channelizing it to percolate into the soil or an underground tank. It is properly maintained and functional at five (5) different places in the campus (Figs on page No. 22).


ग्रामीण प्रौद्योगिकी विभाग
प्रदर्शन एवं प्रशिक्षण केन्द्र
DEPARTMENT OF RURAL TECHNOLOGY
Demonstration and Training Centre


मशरूम उत्पादन केन्द्र


Fibble
Fibble


Activity Centre


COMPOST
For Soil Amendment
and
Clean Environment

Restoration and re-development of the damaged and sliding zone of the University stadium

Uttarakhand disaster 2013 has been one of the worst disasters of the recent times in the region. Unprecedented rains (400 mm) for more than four days during mid-June 2013 resulted in flash floods followed by landslides at many places, killing more than 6000 pilgrims and tourists. Overflowing rivers destroyed many lodges/hotels, human settlements and thousands of hectares of agricultural and forest land. In addition, many of the public buildings, roads, power and telecommunication infrastructure, and other installations including a huge area of about 550 meter in length and 30 meter in width **(approximately 1.65 ha of the stadium and approach road) of the HNBGU stadium was washed away.** To control the further erosion and sliding of the university stadium the competent authority of the University **(Hon'ble Vice Chancellor)** with the support of Indian Railways Rishikesh Karnprayag project, took the big initiative to restore the sliding and eroded zone by using the excavated material (mug) from the railway tunnel near to Srikot as dumping materials. The eroded/damaged areas/zone of the stadium is near to completion stage and will be restore fully through the bio-engineering measures emphasizing more on plantation activities (using primary and secondary successional plant species such as herbs/grasses/shrubs/creepers and trees) following ecological restoration approaches. Once the restored site is properly labelled and managed, the stadium will be fully renovated and efforts is on way to bring it into its original conditions. This will bring new hope among the sports lovers of the Srinagar and adjoining areas and also provide easy road connectivity to everyone in the university as well as to the local people of Chauras. This coordinated efforts of the University and Indian Railways in restoring the sliding zone of the stadium is a herculean task which has not only saved an amount of **Rs. 80.00 crore of the Govt. of India but also** showed a unique example of working together for the common cause of the nation.

4. OUTREACH AND EXTENSION ACTIVITIES THROUGH GREEN CAMPUS INITIATIVES

Department of Forestry and Natural Resources

Department of Forestry and Natural Resources is doing extensive work in the area of afforestation and plantation activities within and outside of the campus. The Department is providing seeds and planting material to various stockholder's and for afforestation programme activities and also sharing the package of practice and related knowledge to the the people. The Department has already developed a herbal garden of trees (i.e. *Terminalia chebula, Terminalia bellirica* and *Emblica officinalis*) with the aim to provide future demand of market and other purposes.

Department of Horticulture

Department of Horticulture has also taken lot of initiative in the many programmes of the campus for their organic products. Department of Horticulture with their planted fruit trees (Mango, kino, kiwi, Guava etc.) is developing many organic products and selling to them in open market using the Hole mark of the University. The Department is actively participating

and planting various valuable species in the campus under Green Campus programme and providing species and knowledge to the farmers, institutions, colleges for plantations purposes

High Altitude Plant Physiology Research Centre (HAPPRC)

HAPPRC, since its inception has been consistently undertaking fundamental and applied research on mountain plants focusing more on high altitude plants and the centre has established an Alpine Research Station at Tung Nath (3400 m altitude). Last so many years the HAPPRC is working on highly valued medicinal plants that are facing varying degree of threat and has developed the agro-technology of several highly valued endangered high altitude medicinal plant species. The centre has also successfully promoted cultivation of some of these species through transfer of technology and training to the farmers of the region and demonstration in farmers' field. **(Pl. see annexure no. 8).**

CHITRA Garden

Campus Horticulture Initiatives Through Reforming Activities (CHITRA) is one of the notable initiatives has been taken by the university under the green campus and the major objectives behind the initiative is to develop the degraded /abandoned land into forest by planting diverse plant species having ecological and economic values. Besides, this initiative also adds aesthetic value of nature, increase calmness, improve physical health reduce loneliness, encourage social cohesion, culture and educational services. **About a total of 2330 plants of different species particularly medicinal and aromatic, horticultural and other multipurpose species were planted in the CHITRA garden between 2020 to 2022 (Pl. see annexure no. 5 & 6).**

Department of Environmental Sciences


Department of Environmental Science is also conducting various awareness programmes in the campus and outside as well to keep environment healthy and free from all the pollutants thus creating a favorable healthy atmosphere for the students, teacher, staff and others in the campus. Recently a small afforestation programme/activity was conducted on the abandoned site lying in the department premise where about 80 trees of five different species such as amla, Tejpatta, citrus, jamun, behada were planted.

Environmental Awareness programme

5. SUMMARY

Green Audit is one of the important tools to check the balance of natural resources and its judicial use. Green auditing is the process of identifying and determining whether institutional practices are eco-friendly and sustainable. It is a process of regular identification, quantification, documenting, reporting and monitoring of environmentally important components in a specified area.

Hemvati Nandan Bahuguna University (HNBGU) has conducted a "Green Audit" in the academic year 2021-22. The main objective to carry out green audit is to check the green practices followed by HNBGU and to conduct a well-defined audit report to understand whether the HNBGU is on the track of sustainable development.

6. CONCLUSION

From the green audit following are the conclusions, which can be taken for improvement in the campus.

- All departments generate paper waste. Especially, academic building is using more one paper for printing and writing is good practices.
- Food waste generated in campus is mostly from is collected from dining areas. The food wasteis diverted to nearby farm.
- E- waste are segregated, handled and disposed properly in an eco-friendly manner.
- Reducing the use of one-time use plastic bottles, cups, folders, pens, bouquets, decorativeitems will be useful to solve the problem of plastic pollution to some extent.
- Rainwater is collected from rooftop to harvest for reuse in non-rainy season.

7. RECOMMENDATIONS

Following are some of the key recommendations for improving campus environment:

- An environmental policy document has to be prepared with all the recommendations andcurrent practice carried by HNBGU.
- A frequent visit should be conducted to ensure that the generated waste is measured,monitored and recorded regularly and information should be made available to administration.
- The solid waste should be reused or recycled at maximum possible places.

❖ Install a water meter to record water usage in the University premises

8. WAY FORWARD AND FUTURE SCOPE OF GREEN CAMPUS

Way Forward

The plantation of trees has been advocated among the students, faculty and other staff of the University for making the university campus green and environment friendly. However, for successful implementation, the strategies should be site-specific, climate resilient and long-term sustainable which in turn is dependent on a multidisciplinary interaction between thestudents, researchers, faculties and policy planners of the university. Thus, the concept of green campuses can play a major role in designing and maintaining sustainable, eco-friendly, climate resilient, smart green universities.

Future scope

Establishment of oxygen park,

- Tree species having potential to sequester maximum co2 need to be promoted and planted in the university campus and these includes Banyan Tree, Neem Tree, Peepal Tree, Arjuna Tree, Ashoka Tree, Indian Bael, Curry Tree, Saptaparni Tree, Jamun Tree, Bamboo Tree, Snake Plant, Aloe Vera, Tulsi, Money plant, Lavender.
- The plantation of tree species with multipurpose values (fiber, fuel, fodder, minor timber, medicinal value, herbal garden, fruits, aesthetic value, etc. need to be encouraged.

9. PHOTOS OF HNB GARHWAL UNIVERSITY CAMPUS

Photo plate 1- Showing photo of Shri Dev Suman Boys Hostel, Dr. Ambedkar Centre of Excellence, Department of Journalism and Mass Communication, Department of Tourism and Hospitality & School of Commerce

Photo plate 2- Showing photo of Department of History & Archaeology, Department of Physics and Chemistry & Himalayan Cultural building.

Photo plate 3- Showing photo of USIC building, Department of Rural Technology, Administrative building of Chauras Campus & Department of Geography.

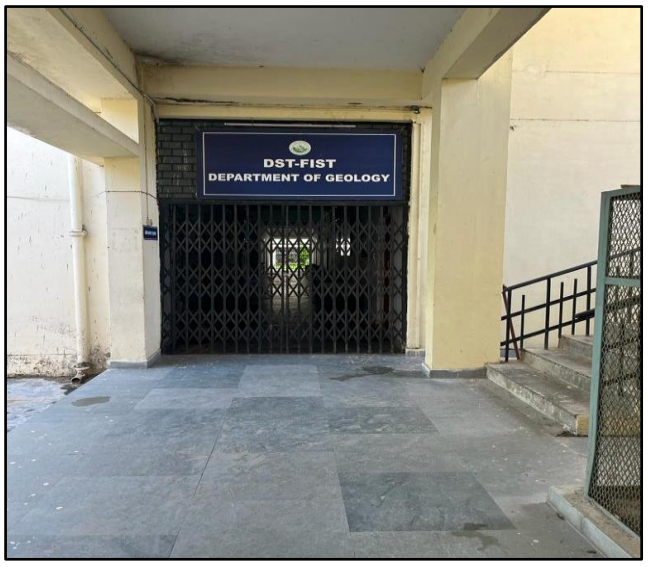


Photo plate 4- Showing photo Department of Geology, Department of Botany, Fish hatchery, Department of Statistics & Department of Astrophysics.

Photo plate 5- Showing photo Girls Hostels (Mandakini, Yamuna, Ganga, Nanda Devi & Bhagirathi).

Photo plate 6- Showing photo Boys Hostel Chaukhamba, Central Library Chauras campus, Auditorium Chauras Campus, Birla campus, & Chauras campus canteen.

Photo plate 7- Showing photo Department of Environmental Sciences, Department of Forestry & Natural resources, Department of Horticulture & Department of Business Management.

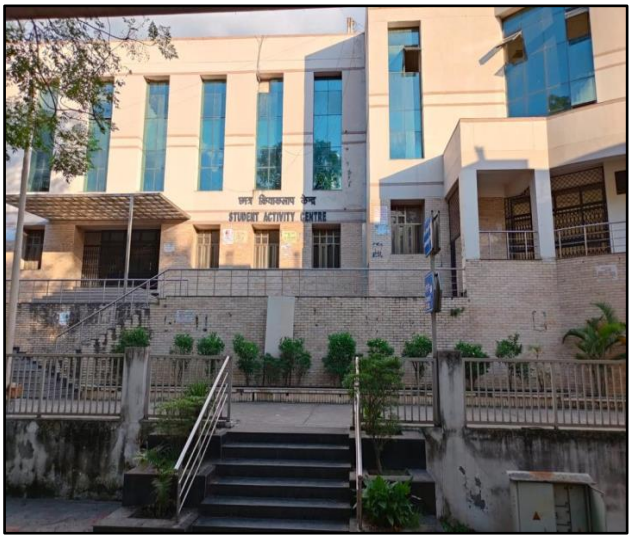


Photo plate 8- Showing photo Department of Engineering, Department of Seed Sciences & Technology, Department of Yoga & B.Ed Ground Birla campus.

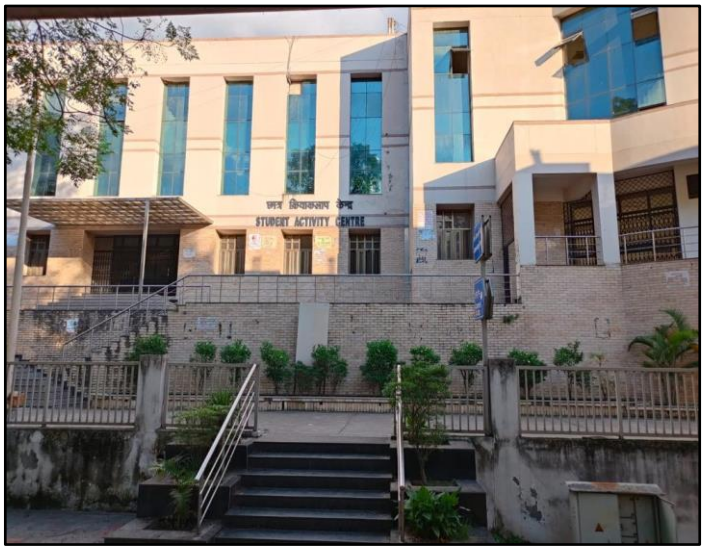


Photo plate 9- Showing photo Gymnasium Birla Campus, Parking Birla campus, Multipurpose Hall & Student Activity centre Birla campus.





Photo plate 10- Showing photo of Sports store, Canteen Birla campus, Department of Physical education & NSS vatika.

Photo plate 11- Showing photo of Department of Economics and Philosophy, Department of Political science and department defence and strategic strategies & Central Library of Birla campus.

Photo plate 12- Showing photo of Department of Vice Chancellor Office, Administrative Building, Silver Jubilee gate Birla campus and Trishul Boys Hostel.

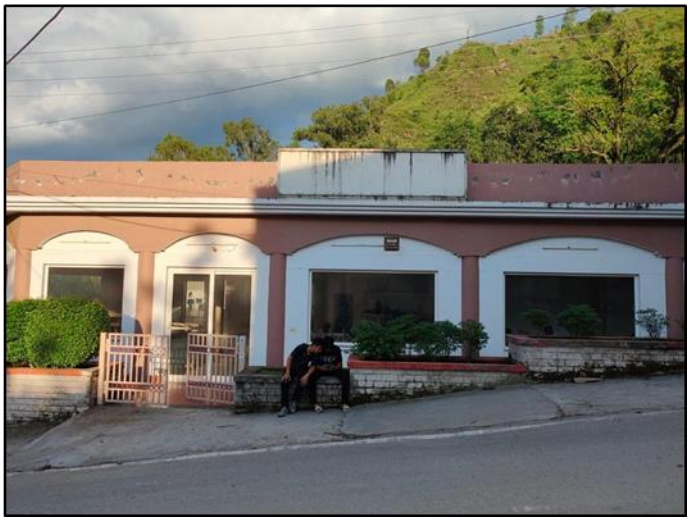


Photo plate 13- Showing photo of University Canteen, Department of Computer science and engineering, Department of Pharmaceutical Sciences, Enquiry centre and administrative block.



Photo plate 14- Showing photo of administrative block Birla campus, Student Health Centre, Construction and maintenance department & Student facility Centre.

Photo plate 15- Showing photo of Chitra Garden HNBGU Initiative.

Photo plate 16- Showing photo of High-Altitude Plant Physiology Research Centre (HAPPRC) HNBGU.

10. ANNEXURE

Annexure-1

Details of Solar Plant Electricity Production at Tehri Campus

S. No.	Period	Name of the Building	Units (in kWh)
1	28-08-2021 to 13-12-2021	Canteen Area	150.00
		Total	**150.00**
2	18-04-2022 to 18-05-2022	Canteen Area	2501.00
		Girls Hostel	2381.00
		Total	**4882.00**
3	25-01-2022 to 08-06-2022	Canteen Area	595.00
		Girls Hostel	735.00
		Building of Law	23.00
		Total	**1352.00**
4	13-12-2022 to 18-04-2022	Canteen Area	2541.00
		Girls Hostel	2.50
		Total	**2543.50**
5	08-06-2022 to 05-07-2022	Canteen Area	1169.00
		Girls Hostel	3427.70
		Building of Law	2116.30
		Total	**6712.30**
6	09-07-2022 to 04-08-2022	Canteen Area	570.00
		Girls Hostel	1087.20
		Building of Law	1113.70
		Total	**2770.90**
7	04-08-2022 To 03-09-2022	Canteen Area	873.40
		Girls Hostel	1092.80
		Building of Law	1598.30
		Total	**3564.50**
8	10-10-2022 to 10-11-2022	Canteen Area	705.90
		Girls Hostel	1350.30
		Building of Law	1069.10
		Total	**3125.30**
9	03-09-2022 to18-10-2022	Canteen Area	1244.10
		Girls Hostel	2467.60
		Building of Law	2130.50
		Total	**5842.20**
10	10-11-2022 to 30-11-2022	Canteen Area	633.30
		Girls Hostel	1058.90
		Building of Law	857.30
		Total	**2549.50**
		G. Total	**33,492.20**

Annexure-2

Details of Solar Plant Electricity Production at Srinagar Campus

S. No.	Period	Name of the Building	Units (in kWh)
1	15-01-2022	Admin. Building	33242.00
		RC Building	13091.00
		School of Social Science	5700.00
		Total	**52033.00**
2	25-01-2022 to 08-06-2022	Admin. Building	49155.00
		RC Building	28731.00
		School of Social Science	9545.00
		Total	**87431.00**

		School of Social Science	1967.00
3	08-06-2022 to 05-07-2022	Admin. Building	10398.00
		RC Building	6467.00
		Total	**18832.00**
4	05-07-2022 to 03-08-2022	Admin. Building	10442.00
		RC Building	1695.00
		School of Social Science	2115.00
		Total	**14252.00**
5	03-08-2022 to 01-09-2022	Admin. Building	11691.00
		RC Building	6880.00
		School of Social Science	2042.00
		Total	**20613.00**
6	03-10-2022 to 03-11-2022	Admin. Building	11103.00
		RC Building	5264.00
		School of Social Science	2180.00
		Total	**18547.00**
7	01-09-202 to 03-10-2022	Admin. Building	10995.00
		RC Building	6062.00
		School of Social Science	1999.00
		Total	**19056.00**
8	03-11-2022 to 02-12-2022	Admin. Building	7622.00
		RC Building	3436.00
		School of Social Science	2071.00
		Total	**13129.00**
		G. Total	**243893.00**

Annexure-3

Details of Solar Plant Electricity Production at Chauras Campus

S. No.	Period	Name of the Building	Units (in kWh)
1	15-01-2022	Horticulture	8366.00
		Museum Building	14788.00
		Girls Hostel	5893.00
		Boys Hostel	10322.00
		Pharmaceutical Science Building	7402.00
		School of Commerce Building	6713.00
		Mass Communication	11370.00
		Engineering Building	31482.00
		Computer Science Building	6198.00
		Total	**4882.00**
2	25-01-2022 to 08-06-2022	Horticulture	24808.00
		Museum Building	33130.00
		Girls Hostel	10406.00
		Boys Hostel	19262.00
		Pharmaceutical Science Building	12603.00
		School of Commerce Building	20936.00
		Mass Communication	20316.00
		Engineering Building	65573.00
		Computer Science Building	14163.50
		Tourism Building	11636.70
		Total	**232834.00**
3	08-06-2022 to 05-07-2022	Horticulture	4999.00
		Museum Building	6676.00
		Girls Hostel	1961.00
		Boys Hostel	3895.00
		Pharmaceutical Science Building	2417.00
		School of Commerce Building	4278.00
		Mass Communication	4050.00
		Engineering Building	13880.00
		Computer Science Building	2553.90
		Tourism Building	2530.40
		Total	**47240.30**
4	05-07-2022 to 02-08-2022	Horticulture	4293.00
		Museum Building	6077.00
		Girls Hostel	1942.00
		Boys Hostel	3594.00
		Pharmaceutical Building	2830.00
		School of Commerce Building	3827.00
		Mass Communication	3625.00
		Engineering Building	12856.0
		Computer Science Building	2412.00
		Tourism Building	2065.00
		Total	**43521.00**
5	02-08-2022 to 01-09-2022	Horticulture	5607.00
		Museum Building	5152.00
		Girls Hostel	2032.00
		Boys Hostel	4329.00
		Pharmaceutical Building	0.00
		School of Commerce Building	4405.00
		Mass Communication	4497.00

		Engineering Building	15563.00
		Computer Science Building	2094.00
		Tourism Building	2523.00
		Total	**46202.00**
		G. Total	**374679.30**

Annexure-4

Details of Solar Plant Electricity Production at Chauras Campus

S. No.	Period	Name of the Building	Units (in kWh)
6	01-10-2022 to 03-11-2022	Horticulture	6048.00
		Museum Building	6700.00
		Girls Hostel	2233.00
		Boys Hostel	4420.00
		Pharmaceutical Building	8617.00
		School of Commerce Building	5183.00
		Mass Communication	4518.00
		Engineering Building	16112.00
		Computer Science Building	3060.10
		Tourism Building	2651.80
		Total	**59542.90**
7	01-09-2022 to 01-10-2022	Horticulture	5197.00
		Museum Building	2902.00
		Girls Hostel	2044.00
		Boys Hostel	4064.00
		Pharmaceutical Building	6006.00
		School of Commerce Building	4605.00
		Mass Communication	4195.00
		Engineering Building	14888.00
		Computer Science Building	1098.90
		Tourism Building	2403.50
		Total	**47403.40**
8	03-11-2022 to 07-12-2022	Horticulture	3619.00
		Museum Building	6169.00
		Girls Hostel	2191.00

		Boys Hostel	2488.00
		Pharmaceutical Building	7281.00
		School of Commerce Building	3686.00
		Mass Communication	3644.00
		Engineering Building	12422.00
		Computer Science Building	1752.90
		Tourism Building	2155.10
		Total	**45408.00**
		G. Total	**527033.60**

List of trees planted (Forestry and Horticulture) at Chitra Garden (Bughani Road, Srinagar Garhwal) from July 2020.

Annexure-5

Trees Planted during 2020-2021 at Chitra Garden

Sr. No.	Local Name	Botanical Name	Family	No. of Plants
Medicinal and Aromatic Trees				
1.	Amla	*Phyllanthus emblica*	Phyllanthaceae	70
2.	Bahera	*Terminalia bellirica*	Combretaceae	14
3.	Harad	*Terminalia chebula*	Combretaceae	28
4.	Reetha	*Sapindus mukorossi*	Sapindaceae	34
5.	Rudraksh	*Elaeocarpus ganitrus*	Elaeocarpaceae	02
6.	Tejpat	*Cinnamomum tamala*	Lauraceae	120
7.	Timru	*Zanthoxylum armatum*	Rutaceae	07
Horticulture (FruitTrees)				
1.	Aam/Mango	*Mangifera indica*	Anacardiaceae	24
2.	Amrood/Guava	*Psidium guajava*	Myrtaceae	34
3.	Anar	*Punica granatum*	Punicaceae	10
4.	Jamun	*Syzygium cumini*	Myrtaceae	600
5.	Kathal	*Artocarpus heterophyllus*	Moraceae	05
6.	Lasoda	*Cordia myxa*	Boraginaceae	05
7.	Litchi	*Litchi chinensis*	Sapindaceae	19
8.	Loquat	*Eriobtrya japonica*	Rosaceae	06
9.	Malta	*Citrus sinensis*	Rutaceae	26
10.	Nimbu/lemon	*Citrus limon*	Rutaceae	32
11.	Sahtoot	*Morus alba*	Moraceae	594
Forest Trees				
1.	Banj	*Quercus leucotrichophora*	Fagaceae	18
2.	Bans	*Dendrocalamus strictus*	Poaceae	13
3.	Bheemal	*Grewia optiva*	Malvaceae	16
4.	Decan	*Melia azedarach*	Meliaceae	180
5.	Fandyat	*Quercus sp.*	Fagaceae	03
6.	Jacrinda	*Jacaranda mimosifolia*	Bignoniaceae	94
7.	Khaina	*Ficus semicordata*	Moraceae	01
8.	Kharik	*Celtis australis*	Cannabaceae	14
9.	Lambpatya	*Lerchia lonigenosa*	-	08
10.	Maloo	*Bauhinia vahlii*	Caesalpiniaceae	01
11.	Manipuri Banj	*Quercus serrata*	Fagaceae	04

12.	Panya	*Prunus cerasoides*	Rosaceae	05
13.	Peepal	*Ficus religiosa*	Moraceae	02
14.	Sandan	*Ougeinia dalbergioides*	Fabaceae	10
15.	Silver Oak	*Grevillea robusta*	Proteaceae	18
16.	Timla	*Ficus racemosa*	Moraceae	02
17.	Toon	*Toona ciliata*	Meliaceae	22
Total no. of saplings planted in 1 ha of land at Chitra Garden				**2041**

Annexure-6

Trees planted on experimental basis during February, 2021-2022

		Botanical Name	Family	No. of Plants
1.	Apple (Anna, Dorsett Golden, Gale Gala)	*Malus* domestica	Rosaceae	80
2.	Apple (HARMN 99, Grafted)	*Malus* domestica	Rosaceae	100
3.	Apricot (Ema, New Castel)	*Prunusarmeniac a*	Rosaceae	16
4.	Pear (PekhamTriamph, Bagugosha)	*Pyrus spp.*	Rosaceae	10
5.	Pomo (Kandhari)	*Punicagranatum*	Lythraceae	8
6.	Plum (Black Amber, Daurte, Friar, Mariposa, Red Beaut, Santa Rosa)	*Prunusdomestica*	Rosaceae	45
7.	Persimmon (Fuyu/Raw Eating)	*Diospyros kaki*	Ebenaceae	05
8.	Kiwi (Allison, Hayward)	*Actinidiadeliciosa,*	Actinidiaceae	25
	Total no. of saplings planted in 1 ha of land at Chitra Garden			**289**

Annexure-7

Trees planted at Chauras Campus (2021- 2022) under Green Initiatives

Sr.No.	Botanical Name	Common Name	Family	No. of Plants
1.	*Bahunia purperia*	Kachnar	Fabaceae /Leguminosae	10
2.	*Bahunia tomentosa*	PiliKachnar	Fabaceae /Leguminosae	20
3.	*Bahunia verigata*	Kachnar	Fabaceae /Leguminosae	10
4.	*Callistemon viminalis*	Botel Brush	Myrtaceae	15
5.	*Cassia fistula*	Amaltash	Leguminosae/ Caesalpiniaceae/Fabaceae	20
6.	*Cordia dichotoma*	Lashoda	*Boraginaceae*	10
7.	*Jacaranda mimosaefolia*	Jakrenda	Bignoniaceae	20
8.	*Lagerstroemia speciosa*	Dhoudi	Lythraceae	30
9.	*Plumeria rubra*	Pulmeria	Apocynaceae	20
10.	*Koelreuteria paniculata*	Golden rain tree	Sapindaceae	20
11.	*Lagerstroemia indica*	Saawni	Lythraceae	50
12.	*Ficus carica*	Anjeer	Moraceae	15
13.	*Moringa*	Sahjan	Moringaceae	15
14.	*Almonda blanchetii*	Almonda	Apocynaceae	20
15.	*Ceasalpenia pulcherrima*	Chotigulmohar	Fabaceae	15
16.	*Mussaenda erythrophylla*	Musanda	Rubiaceae	05
17.	*Geranium*	Geranium	Geraniaceae	20
18.	*Punica granatum*	Anaar	Lythraceae	20
19.	*Psidium gujava*	Amrood	Myrtaceae	20
20.	*Artocarpus heterophyllus*	Kathal	Moraceae	10
21.	*Michalia fuskata*	Chotichampa	Magnoliaceae	10
22.	*Azadarica indica*	Neem	Meliaceae	10
23.	*Eleocarpus genitrus*	Rudraksh	Elaeocarpaceae	10
24.	*Francesia*	Francesia	Solanaceae	10
25.	*Ervatamia divaricata*	Chandni Hara	Apocynaceae	10
26.	*Euforbia cotonifolia*	Euphorbia	Euphorbiaceae	10
27.	*Hibiscus mutabillis*	Domia	Malvaceae	10
28.	*Melaleuca*	Copper plant	Myrtaceae	10
29.	*Podocarpus chinensis*	Podocarpus	Podocarpaceae	10
30.	*Pterospermum acerifolium*	KanakChampa	Malvaceae	10
31.	*Castano spermum*	Kestonspermum	Fabaceae or Leguminosae	10
32.	*Putranjiva roxburghaii*	Putranjiwa	Putranjivaceae	10
33.	*Delonix regia*	Gulmohar	Fabaceae	10
34.	*Salix babylonica*	Majnu Tree	Salicaceae	10
35.	*Salix tetrasperma*	Indian willow	Salicaceae	10
36.	*Dendrocalmus strictus*	Lathi Bans	Poaceae	10
37.	*Bambus vulgaris wamin*	Lota Bans	Poaceae	10
38.	*Bambusa vulgaris striata*	Pila Bans	Poaceae	05
				540

Annexure-8

TREE GERMPLASM AVAILABLE IN HIGH ALTITUDE PLANT PHYSIOLOGY RESEARCH CENTRE

S.No.	Common name	Botanical name	Family	Available numbers
1	Jacaranda	*Jacaranda mimosifolia*	Bignoniaceae	15
2	Shirish	*Albiziastipulata*	Fabaceae	10
3	Kharik	*Celtisaustralis*	Cannabaceae	
4	Silver oak	*Grevillearobusta*	Proteaceae	22
5	Tejpat	*Cinnamomumtamala*	Lauraceae	15
6	Wild pear	*Pyruspashia*	Rosaceae	16
7	Babool	*Vachellianilutica*	Fabaceae	2
8	Mango	*Mangiferaindica*	Anacrdiaceae	5
9	Padam	*Prunuscerasoides*	Rosaceae	12
10	Bhimal	*Grewiaoptiva*	Tiliaceae	2
11	Reetha	*Sapindusmukorossi*	Sapindaceae	6
12	Khair	*Acacia catechu*	Fabaceae	4
13	Karma	*Adina cordifolia*	Rubiaceae	30
14	Himalyan chestnut	*Aesculusindica*	Sapindaceae	1
15	Amla	*Phyllanthusemblica*	Phyllanthaceae	2
16	Timla	*Ficusauriculata*	Moraceae	5
17	Bedu	*Ficuspalmata*	Moraceae	2
18	Pipal	*Ficusreligiosa*	Moraceae	1
19	Bargad	*Ficusbengalensis*	Moraceae	1
20	Khaina	*Ficusemicordata*	Moraceae	2
21	Gular	*Ficusglomerata*	Moraceae	8
22	Anjir	*Ficusracemosa*	Moraceae	3
23	Amaltas	*Cassia fistula*	Fabaceae	1
24	Semal	*Bombexceiba*	Malvaceae	5
25	Sandalwood	*Santalum album,*	Santalaceae	10
26	Jamun	*Syzygiumcumini*	Myrtaceae	13
27	Mulberry	*Morusalba*	Moraceae	4
28	Kafal	*Myricaesculenta*	Myricaceae	1
29	Sandan	*Ougeiniadelbergiodes*	Papilionaceae	6
30	Chilbil	*Holopteleaintegrifolia*	Ulmaceae	1
31	Kamala (shendri)	*Mallotusphilippinensis*	Euphorbiaceae	5
32	Dainkan	Meliaazedarach	Meliaceae	6

33	Curry leaf	*Murrayakoenigii*	Rutaceae	20
34	Kachnar	*Bauhinia variegata*	Fabaceae	7
35	Toon	*Toonaciliata*	Meliaceae	14
36	Lasoda	*Cordiamyxa*	Boraginaceae	3
37	Shisham	*Delbergiasissoo*	Fabaceae	20
38	Mahoe	*Hibiscus elatus*	Malvaceae	6
39	Falyant	*Quercusglauca*	Fagaceae	25
40	Oak	*Quercusserrata*	Fagaceae	5
41	Oak	*Quercusleucotrichophora*	Fagaceae	8
42	Neoistea	*Neolisteacuipala*	Lauraceae	27
43	Timru	*Zanthoxylumarmatum*	Rutaceae	6
44	Pine	*Pinusroxburghii*	Pinaceae	-
45	Surai	*Cupressustorulosa*	Cupressaceae	10
46	Ringalu	*Drepanostachyumfalcatum*	Poaceae	2
47	Parijat	*Nyctanthes arbor-tristis*	Oleaceae	2
48	Guava	*Psidiumguajava*	Myrtaceae	1
49	Kaner	*Nerium oleander*	Apocynaceae	1
50	Gudhal	*Hibiscus rosasinensis*	Malvaceae	2
51	Karanja	*Pongamiapinnata*	Fabaceae	1
52	Monkey puzzle	*Araucaria columnaris*	Araucariaceae	4
53	Malta	*Citrus sinensis*	Rutaceae	4
54	Bougainvillea	*Bougainvillea glabra*	Bougainvilleeae	1
55	Peach	*Prunuspersica*	Rosaceae	6
56	Loquat	*Eriobotrya japonica*	Rosaceae	3
57	Rudraksha	*Elaeocarpusganitrus*	Elaeocarpaceae	1
58	Castor	*Ricinuscommunis*	Euphorbiaceae	1
59	Apple	*Malusdomestica*	Rosaceae	20
60	Crape myrtle	*Lagerstroemia indica*	Lythraceae	1
61	Paper mulberry	*Broussonetiapapyrifera*	Moraceae	
62	A1	*Unidentified plant*		
63	Juniper	*Juniper spp.*	Cupressaceae	
64	Duranta	*Durantaerecta*	Verbenaceae	-
65	Rubber plant	*Ficuselastica*	Moraceae	2
66	Yellow bells	*Tecomastans*	Bignoniaceae	1
67	Gardenia	*Gardenia jasminoides*	Rubiaceae	1

68	Ponytail palm	*Beaucarnearecurvata*	Asparagceae	1
69	Sandan	*Ougeniaoojeinesis*	Fabaceae	-
70	Fountain palm	*Livistonachinensis*	Palmae	2
71	Chiuri	*Bassiabutyracea*	Sapotaceae	
Total				433

S.No.	Plant detail	Total
1	Total number of plants	433
2	Total number of species	71
3	Total number of family	34

- **Number of species in family**

S.No.	Family	Total
1	Bignoniaceae	2
2	Fabaceae	7
3	Cannabaceae	1
4	Proteaceae	1
5	Lauraceae	2
6	Rosaceae	4
7	Tiliaceae	1
8	Sapindaceae	2
9	Rubiaceae	2
10	Phyllanthaceae	1
11	Moraceae	8
12	Malvaceae	3
13	Santalaceae	1
14	Myricaceae	2
15	Papilionaceae	1
16	Ulmaceae	1
17	Euphorbiaceae	2
18	Meliaceae	2
19	Rutaceae	3
20	Boraginaceae	1
21	Fagaceae	3
22	Pinaceae	1
23	Cupressaceae	1
24	Poaceae	1
25	Oleaceae	1

26	Apocynaceae	1
27	Araucariaceae	1
28	Bougainvilleeae	1
29	Eleocarpaceae	1
30	Lythraceae	1
31	Asparagaceae	1
32	Palmae	1
33	Sapotaceae	1
34	Verbenaceae	1

Annexure-9

List of Tree Species of SRT (Tehri) Campus

S.No.	Name of family/species
1.	*Cedrela serrata* Royle
2.	*Euonymus pendulus* Wall. ex Roxb.
3.	*Acer oblongum* Wall. Ex DC.
4.	*Erythrina suberosa* Roxb.
5.	*Bauhinia racemosa* L.
6.	*Albizia chinensis* (Osbeck) Merrill
7.	*Prunus cerasoides* D.Don
8.	*Pyrus pashia* Buch.-Ham. ex D.Don
9.	*Punica granatum* L.
10.	*Benthamidia capitata* (Wall. ex Roxb.) Hara
11.	*Cornus macrophylla* Wallich
12.	*Lyonia ovalifolia* (Wallich) Drude
13.	*Rhododendron arboreum* Smith
14.	*Nyctanthes arbor-tristis* L.
15.	*Mallotus philippensis* (Lam.) Muell.-Arg.
16.	*Engelhardtia spicata* Leschenault ex Blume
17.	*Juglans regia* L.
18.	*Myrica esculenta* Buch.-Ham. ex D.Don
19.	*Quercus leucotrichophora* A. Camus
20.	*Pinus roxburghii* Sargent

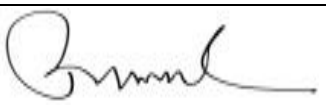
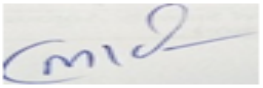
Annexure-10

Diversity Of trees planted/Growing naturally in the BGR (Pauri) campus of university

S. No	Scientific Name	Local Name	Science, Low, Library and Boy's Hostel	Arts, Commerce and Admin Block	Education Block and Girls Hostel	Teachers and staff colony
1	*Pinus roxburghii,*	Chir	40-50	30-40	20	60
2.	*Cedrus devdar*	Devdar	uncountable	100-110	30-50	20-30
3	*Cupressus torulosa*	Surai	40-50	50-60	30-40	30
4	*Myrica esculenta,*	Kaphal	05-10	05	-	05-10
5	*Rhododendron arboretum,*	Burans	10-20	-	-	-
6	*Quercus leucotrichophora,*	Banj	10	20	-	05

7	*Quercus glauca*	Harinj	5	5	-	-
	Quercus serrata	Oak	7	-	4	-
7	*Prunus cerasoides*	Painya	-	-	20	50-100
8	*Juglans regia*	Akhrot	4-6	6-8	4	6
9	*Aesculus indica*	Pangar	-	5	-	-
10	*Alnus nepalensis*	Udish	-	4-8	-	-
11	*Celtis australis*	Kharik	-	-	3-7	10-20
12	*Cinnamomum tamala*	Tejpat	10	15-20	-	15-20
13	*Populous tremuloides*	Populus	-	-	-	3
14	*Ficus auriculata*	Timla	-	5	3	10-20
15	*Ficus carica*	Bedu	-	10	15	20-30
16	*Ficus semicordata*	Khaina	4	-	-	-
17	*Ficus cunia*					
18	*Ficus religiosa*	Pipal	-	1	-	1
19	*Citrus limon*	Nimbu/ Lemon	2	4	-	10
20	*Citrus medica*	Fingers citron				
21	*Citrus sinensis*	Malta	4	6	7	20-30
22	*Ficus racemosa*	Anjir	-	-	8	10
23	*Malus domestica*	Apple	-	9	-	30
24	*Prunus armeniaca*	Apricot	-	-	-	20
25	*Prunus cerasoides*	Padam	10-12	10-15	20-30	30
26	*Prunus domestica*	Plum	5-10	10	8-12	8-12
27	*Prunus persica*	Peach	-	-	-	10
28	*Punica granatum*	Anar	-	-	-	15
29	*Pyrus pashia*	Wild pear	5	5-10	3-6	5-10
30	*Sapindus mukorossi*	Reetha	-	3	-	-
31	*Toona ciliate*	Toon	-	5	4	6
32	*Ficus racemosa*	Umra	-	-	-	8
33.	*Pyrus pashia*	Melu	2	5	5-9	8
34.	*Punica granatum*	Dadim	-	-	-	6
35.	*Emblica officinale*	Amala	-	-	-	5
36.	*Cornus capitata*	Bhamora	4-8	-	-	-
37.	*Malus pumilo*	Apple	4	6	7	20-30

Signature of Internal and External Team Member of Green Audit Committee

Prof. R.K. Maikhuri, Convener	
Prof. Munesh Kumar, Member	
Dr. V.K.Prohit, Member	
Er M.P. Dobhal, Member	
Dr. D.K. Rana, Member	
Dr. J.P. Mehta, Member	
Dr. B.S Bhandari, Memer	
Dr Laxman Kandari	
Dr. J.S. Butola, Member	
Mr. Suraj Kumar Upadhyay External Member Industrial Safety and Environmental Technical Services-Ghaziabad	

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Certificate Valid Until	: 16/02/2026	*Second Surveillance due on*	: 16/02/2025
Next audit due on	: 16/02/2024		

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Director

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