



Registration No. IV/73/59-76/2014

ANNUAL REPORT 2019-20

Overview

This year was marked by the expansion of the activities of the organisation into other parts of Almora District and into other aspects of environment protection. It was also a year of close collaboration with the District Administration. We are grateful to the District Magistrate, Mr. Nitin Bhaduria and the Chief Development Officer, Mr. Manuj Goyal for their constant encouragement and support.

Solid Waste Management continued to be our focus in Almora town, our aim being to transfer the expertise gained in the previous year in awareness raising and door-to-door collection of plastic waste to the municipal sanitation staff. A group of residents in Majkhali near Ranikhet requested Green Hills to take up solid waste management in five villages of the Block. Contributions made by individuals and commercial establishments were received and a Cleanliness Drive launched in March 2020 with local school children. The waste management activity that was to follow was postponed due to the COVID 19 lock down.

Under the State Swajal project, Green Hills was allotted four villages near the Kasar Devi temple in Almora to plan and monitor infrastructure building for solid and liquid waste management. Detailed Project Reports (DPRs) for each village have been approved but construction will only begin once the District authorities have transferred funds to the village Swachhta Samitis tasked with it. Liquid waste management is one of the new themes that the organisation has taken up. It is actively promoting waste water recycling through root zone treatment and has teamed up with a young Indian engineer studying at a Swedish university to prepare a proposal for vermi-filtration of waste water in Almora town.

Reforestation was the second new theme. World Environment Day was organised with the District Administration and saw about 400 saplings of 30 different indigenous species supplied by the Forest Department being distributed to school children for them to nurture. As part of the Kosi Rejuvenation Scheme, these saplings were then planted by them during Harela in a part of the Maat Community Forest. The survival rate of the saplings is about 90 per cent. A contribution to this work is expected from the District Administration.

These activities were carried out with financial support from the Lal Family Foundation and CSR funds from Banyan Tours Pvt. Ltd. We are very grateful to both these donors as well as to the residents of Majkhali for their contributions.

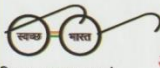
The three year research project on Stinging Nettle (*Urtica dioica*) as a food supplement ended on April 30, 2019. Presentations of the results were communicated to scientists at conferences and through four articles in specialised publications (See the list in the Annexure

l). A new proposal was prepared for development and marketing of products containing nettle that was submitted to the National Mission on Himalayan Studies.

Waste management

As a follow-up to door-to-door collection of plastic waste from Almora town and its use by the PWD and PMGSY in road construction, an agreement was made with the Nagar Palika Parishad, Almora for supervisors of Green Hills to work with the municipal sanitation staff to raise awareness on segregation of waste into three – wet, dry and dirty – and facilitate door-to-door collection of it by the *safai karmcharis* designated for each locality.


Funding from the Lal Family Foundation enabled us to hire a team of two supervisors and three waste collectors for the year. Work began in July 2019 with meetings with the *naiks* and *safai karmcharis* followed by visits to households in selected wards by Green Hills to explain source segregation. A flyer explaining the three types of waste was distributed to inhabitants during house-to-house visits and boards with this information erected in prominent places in the town. People were willing to segregate their waste as indicated but asked who would collect it.



जिला प्रशासन एवं
नगर पालिका परिषद
अल्मोड़ा
मो०- 9412092243




स्वच्छ अल्मोड़ा अभियान

अपने घरों के कूड़े को रिसायकल करने में सहयोग दें



पर्यावरण बचाओ
मो०- 9557161861

किसी भी तरह के कूड़े को इधर-उधर ना फेंकें। घर में कूड़े को एक साथ ना मिलायें और ध्यान से अलग-अलग रखें।

 गीला कम्पोस्ट योग्य कूड़ा	 सूखा रीसाइक्लिंग योग्य कूड़ा	 गंदा जलाने वाला कूड़ा
रसोई एवं बगीचे से निकलने वाला समस्त कूड़ा	प्लास्टिक, दूध, नमकीन एवं पान मसाले के पैकेट, कागज, गत्ता, कांच के टुकड़े और बोतल, जूते चप्पल, ब्लेड, लोहा, एल्यूमिनियम पत्ती, टिन, बैटरी, बल्ब व ई-कचरा	घर का झाड़ू किया कचरा, बच्चों के डायपर, सैनिटरी नैपकीन, बाल, कन्डोम एवं अन्य अस्पताल का कूड़ा

इस कचरे का क्या होगा? गीले कचरे को नगर पालिका द्वारा कम्पोस्टिंग द्वारा जैविक खाद में बदला जाएगा। सूखे कचरे को रिसायकलिंग के लिए भेजा जायेगा। गंदे कचरे को शहर के बाहर ले जाकर इन्सिनेरेटर (मशीन) में जलाया जायेगा।

घर-घर से कूड़े का एकत्रीकरण – ग्रीन हिल्स संस्था के सहयोग से अलग-अलग रखा गया गीला एवं गंदा कूड़ा नगर पालिका के सफाई कर्मचारी हर रोज आपके घर से उठावेंगे और सूखा कूड़ा सप्ताह में एक बार उठाया जायेगा।

अनुरोध- कृपया शनिवार सुबह से रविवार शाम तक कूड़ा कूड़ेदान में न डालें क्योंकि रविवार को कूड़ा नहीं उठाया जाता है।

नवल चिंटर्स, नंदा देवी, अल्मोड़ा मो०- 9719099588



Motivating Safai karmcharis

Daily door-to-door collection was the duty of the *safai karmcharis* but only about 10 per cent of them were willing to do this, despite every effort on the part of our supervisors to motivate them. Others would sweep their area and leave after a couple of hours of work as they had another job during the day. The culture of permanent workers shortening their working hours or outsourcing their work for a pittance to others is deeply ingrained and upheld by the workers' union. Besides, the Nagar Palika took three or four months to buy the bags they needed to collect segregated waste. Green Hills

provided the bags but as the pick-up van is not equipped to keep the three types of waste separate, it is being mixed together and sent to the dumpsite.

Segregated plastic and e-waste was collected by the three Green Hills waste collectors from four wards of Almora. The supervisors also did a survey of neighbourhoods in those wards to find out how frequently the *safai karmcharis* came to collect waste. The responses of residents are being collated and will be shared with the Nagar Palika.



Majkhali Clean up

This team of five persons assisted by volunteers of Green Hills from Almora as well as residents and school children of Majkhali undertook a three-day cleanliness drive in the beginning of March to collect waste that was littering the roadsides and streams and transport it to the landfill in Ranikhet. The plan was to follow this up with bi-weekly announcements through loud speaker to raise awareness while undertaking door-to-door collection of segregated dry and insanitary waste. A small incinerator for insanitary waste has been installed and a store room rented for recyclables. Once restrictions on mobility are lifted, regular collection of segregated waste will begin in Majkhali.



Waste management is also part of the Swajal programme of the government in rural areas. Green Hills signed an agreement with the District Development Office for preparing DPRs and monitoring their implementation for disposal of solid and liquid waste in the villages of Balta, Bhilyuda, Gadholi and Matena, all situated on the Kasar Devi ridge.

Green Hills' office bearers and staff visited these villages and formed Swachta Committees in each of them. The supervisor facilitated the opening of an account for each committee. A junior engineer was engaged to prepare DPRs and submit them to the Swajal office of the district. These included innovative ways of recycling grey waste water through root zone treatment so that it could be reused for irrigation. Green Hills also designed large dustbins for dry waste and smaller ones for insanitary waste that were more practical for clearing than the garbage pits prescribed under Swajal. All four DPRs have been approved by the district authorities and construction will begin once funds are transferred to the village *pradhans*.

The Swajal programme creates the infrastructure for solid and liquid waste disposal but has no provision for its servicing or maintenance. As Kasar Devi is popular with international tourists, the District Administration wishes to initiate ecological solid waste management in the area. Green Hills participated in planning meetings for this purpose. Here again, the Corona crisis has delayed implementation of these plans and put tourism on hold. A proposal made by Green Hills for collection and sorting of recyclable waste followed by transport to recycling facilities is under consideration by the District Administration.

Green Hills was also asked by the District Magistrate to prepare a proposal for solid waste management in two new wards of Almora - Dugal Khola and Raila Pali - which are not serviced by the municipal sanitation staff at present. This proposal was presented to GAIL by the District office and is awaiting approval.

At a recent meeting with the Chairman of the Almora Nagar Palika, he expressed concern about the lack of treatment of waste water flowing out of the town. Green Hills had already discussed this problem and had sent one of its young volunteers, Mr. Kshitij Aggarwal, architect, for a training held in Leh, Ladakh, on Faecal Sludge Management. Furthermore, through the Sustainable Sanitation Alliance, we got in touch with an Indian engineer doing work on the vermi-filtration technique for treatment of waste water for his doctorate from a university in Sweden. With his help an outline was prepared for piloting a vermi-filtration plant in Almora and submitted to the Vodafone and NASSCOM Foundations' "Ideate for impact" contest. The results are eagerly awaited for besides effective treatment of waste water, this unit would also generate a useful by-product – cocopeat that can be used for soil improvement in our reforestation programme.

Reforestation as a means of mitigation of global warming

Indigenous forests of the Himalayas play a major role in reducing the carbon footprint of the country. However, the proliferation of pines has greatly reduced the number of broad leafed trees and, consequently the supply of water in mountain springs.

With financial support from Banyan Tours Pvt. Ltd., a pilot reforestation project was undertaken in the village of Maat with the consent of the van panchayat members. Saplings of different indigenous species – oak, Himalayan cypress, rhododendron, utis, kafal, etc. (see full list attached), provided by the Forest Department, were distributed to school students on World Environment Day. They were asked to nurture the young plants until Harela when they were invited to a function chaired by the District Magistrate to plant them in the Maat forest on July 13, 2019. Prior to plantation, labour was hired to uproot invasive alien species – lantana, kala basa (*Eupatorium*), *parthenium*, etc. dig water trenches, make pathways and dig holes for tree planting. A fertiliser called "*jeev amrit*" (mixture of cow dung, cow urine,

besan and earth) was fermented in advance and poured into each hole just before plantation.



World Environment Day - Sapling distribution



Planted by the DM

The Divisional Forest Officer and his team instructed the school children and supervised the planting. We are grateful to the Divisional Forest Officer, Mr. K. S. Rawat, for his assistance without which the programme could not have been conducted. The Forest Department also offered to contribute to the cost of fencing and protection of the young plants from grazing. Green Hills then fenced parts of the forest and erected tree guards around about 100 trees so that pathways used by the villagers were still accessible.



Another 200 trees were planted following the Miyawaki method for fast growing of indigenous forests. Advice from Ms. Sheeba Sen of Alaap helped in the choice and combination of species. To prepare a 200 square metre patch, all the earth was dug to a depth of two feet, stones removed and dung compost and *bhoosa* mixed in while replacing the earth. Each four square metre area was planted with one canopy tree, one tree, one sub-tree and a bush using jeev amrit. The patch was then fenced with barbed wire reinforced with thorns to make it inaccessible to cattle and goats. The trees inside this patch have a better rate of survival and a faster growth rate than those planted outside it, thus proving the importance of soil improvement and companion planting. A contribution by the District

Administration towards ground preparation and tree planting from the Kosi Rejuvenation Fund is expected shortly.

To foster environmental consciousness among the children of the village, a small playground with swings, a slide, a sand pit and a *machaan*, was constructed after consultation with them. The wooden pillars and barriers were beautifully painted by a group of international residents of Kasar Devi in attractive colours. This was inaugurated on February 15, 2020 by the District Magistrate, Mr. Nitin Bhadauria, the Chief Development Officer, Mr. Manuj Goyal and other members of their staff. About one hundred children, accompanied by some teachers from the Maat primary school, attended and enjoyed playing in it.



Nettle – an animal resistant plant and nutritious food supplement

Realizing the significance of wild stinging nettle (*Urtica dioica*) as a solution to the prevailing malnutrition, this plant was chosen as a subject of study. The experimental material was collected from four different locations in the Kumaun region of Uttarakhand and cultivated in two replicated plots in the field at Almora. Green Hills started working on the project 'Exploring nettle as an alternative nutrition-rich field crop in Uttarakhand' with a grant from the Govind Ballabh Pant National Institute of Himalayan Environment and Sustainable Development. The project commenced on 1st May 2016 and the final report was submitted in June 2019. Three years of field and laboratory study and analysis of data suggest that Himalayan nettle being rich source of protein, calcium, magnesium, iron, amino acids and other nutrients can be explored for product development.

A new phase of this research is aimed at nutritional profiling and product development. Green Hills is promoting stinging nettle as an alternative cash crop in order to resuscitate the declining agricultural scenario of Uttarakhand and generate a sustainable income for women. With this aim, a new proposal titled 'Exploring the livelihood potential of wild-growing stinging nettle (*Urtica dioica*) in Uttarakhand' was formulated and submitted to the 'National Mission on Himalayan Studies' in June, 2019. Though the project has been approved, the sanction letter is still awaited. The project will be executed by Green Hills Trust in partnership with the Govind Ballabh Pant University of Agriculture and Technology, Pantnagar (GBPUA&T) and National Collateral Management Ltd (NCML).

Moving forward

In the coming years Green Hills plans to move forward with solid and liquid waste management, reforestation and marketing of products made from nettle. With support from

the District Administration, we hope to convince PWD and PMGSY to propagate the use of waste plastic in road building. This will stem the rapid deterioration of the road surface in Almora that is at present in a pitiable condition. To achieve this, using plastic waste in road construction must prove to be economical for these agencies. To avoid the high cost incurred of transporting the waste to Kathgodam to have it washed and shredded there, it is necessary to establish a small plastic waste recycling unit in the district to sort, wash, and shred the plastic to the size required for road building. On an experimental basis, this unit can also mould a part of the plastic into pavers and test the demand for them in the local market. This will create employment for local women and, possibly for some migrant workers who have returned from urban areas. A proposal for this is being submitted to the District administration.

Subject to availability of funds, the team that has been working in Almora town will be diverted to servicing the Kasar Devi and Majkhali zones. Awareness-raising on source segregation and regular collection of dry and insanitary waste will take place. It is hoped that a segregation centre can be built under the Swajal project for sorting, cleaning and storing of recyclables in Kasar Devi. Insanitary waste will be incinerated in drums adapted for the purpose. Plastic waste will be recycled locally if the unit is established, e-waste sent to a partner organisation in Delhi for state-of-the-art recycling and other recyclables channelled to recycling facilities. At present, glass waste abounds and is not systematically recycled.

Under the Swajal programme, waste water recycling for purposes of irrigation will be pursued. A separate project for vermi-filtration of waste water from Almora town is being designed.

The possibility of replicating the Miyawaki method of indigenous forest creation will be explored with the Forest Department. Green Hills wishes to take this up in parts of the Simtola Nature Reserve.

Together with all these new initiatives, the development of marketable products using nettle will be an important part of the project portfolio of Green Hills.

June 20, 2020

Nettle research project – dissemination of results

List of papers published / accepted

1. Pant V., Sundriyal R.C. 2016. Nutritional and therapeutic efficacy of Stinging Nettle- A review. The Journal of Ethnobiology and Traditional Medicine. Photon 126, 1240-1254.
2. Pant V., 2019. Himalayan Stinging Nettle: Rich Source of Protein and Minerals. The Journal of Ethnobiology and Traditional Medicine. Photon 130, 1487-1509
3. Pant V. Significance of wild eatables in traditional diet with specific reference to Stinging nettle. Accepted in "Nurturing Traditions: An International Refereed Journal on the Himalayas". Date of acceptance 4 April 2019.
4. Pant V. Rich biodiversity is strength of Himalayan environment: Stinging nettle (*Urtica dioica*) an example. Accepted in Manimahesh: a journal of Himalayan studies. Date of acceptance: 21 June 2019.

Seminars at which the study was presented:

5. Exploring stinging nettle as an alternative nutrition rich field crop in Uttarakhand- 11th Uttarakhand State Science and Technology Congress- March 2017
6. Stinging Nettle: A nutritional wild edible- 12th Uttarakhand State Science and Technology Congress- March 2018
7. Analysis of stinging nettle for its significance in nutritional security -13th Uttarakhand State Science and Technology Congress- March 2019
8. Significance of wild eatables in traditional diet with specific reference to Stinging nettle, Paper presented in seminar, Emergence of language, culture and technologies at JRN Rajasthan Vidyapeeth, Udaipur, 7-9 November 2016. Thematic area: History of traditional knowledge, science and technology
9. Rich biodiversity is strength of Himalayan environment: Stinging nettle (*Urtica dioica*) an example, paper presented in National seminar on Himalayan history, culture, environment and archaeology, organised by Himanchal State Museum Simla November 2018.
10. Significance of wild eatables in nutritional security: stinging nettle an example: paper presented in 50th Annual International Conference of NSI (Nutrition society of India) Theme: India's Transition from Food Security to Nutrition Security at National Institute of Nutrition, Hyderabad.

Annexure II

Trees planted in Maat panchayat van

Scientific Name	नाम	Name	सतह
<i>Alnus nepalensis</i>	उत्तीस	Utis	कैनपी
<i>Juglans regia</i>	अखरोट	Akhrot	पेड़
<i>Myrica esculenta</i>	काफल	Kaafal	पेड़
<i>Prunus cerasoides</i>	पदम	Padam	पेड़
<i>Morus Alba</i>	शहतूत	Shahtoot	पेड़
<i>Quercus Floribunda</i>	तिलोज	Tilonj	पेड़
<i>Quercus glauca</i>	फल्यांट	Phalyaant	पेड़
<i>Toona serrata</i>	तून	Toon	पेड़
<i>Cornus capitata / Benthamidia capitata</i>	बमौर	Bamour	उप पेड़
<i>Pyrus pashia</i>	मेहल	Mehal	उप पेड़
<i>Rhododendron arboreum</i>	बुरांश	Buransh	उप पेड़
<i>Ficus nemoralis</i>	दूधिला	Dudhila	उप पेड़
<i>Ficus palmate</i>	बेडु	Bedu	उप पेड़
<i>Ficus roxburghii</i>	तिमिल	Timil	उप पेड़
<i>Flemingia macrophylla</i>	भटुला	Bhatula	झाड़
<i>Desmodium elegans</i>	चमलैट	Chamlait	झाड़
<i>Elaeagnus parvifolia</i>	गेवै	Gewain	झाड़
<i>Berberis asiatica</i>	किल्मोड़ा	Kilmora	झाड़
<i>Viburnum cotinifolium</i>	गुइन्या	Guinyan	झाड़