

Table of Contents		
CHAPTER 1	ABOUT THE INSTITUTE	1
1.1	Constitution	1
1.2	Vision	1
1.3.	Mission	1
1.4	Objectives	1
1.5	Functions	1
1.6	Governance	2
1.6.1.	General Body	2
1.6.2.	Governing Body	2
1.6.3.	Committees	2
1.7	Organizational Structure	4
CHAPTER 2	MAJOR ACTIVITIES	5
2.1	Centre for Capacity Building – Training/Workshop	5
a)	Training programmes	5
b)	Photo Gallery-Training programmes	5
2.2	Research Programmes	6
2.2.1.	Centre for Lake Conservation	6
	1. Developing Conservation Strategies for the Water bodies in Huballi Dharwad Municipal Corporation (HDMC)	6
	2. Documentation of the Yettinahole Project Sites and Assessment of Cumulative Impact of Multiple Projects in a Forested Landscape	6
	3. Assisting Bruhat Bengaluru Mahanagara Palike (BBMP) to Make Application for Prime Ministers Award for Excellence in Public Administration	8
2.2.2.	Centre for Climate Change	8
I.	Research Activities	8
A.	Completed Projects	8
	1. Vulnerability Profile of Karnataka State: District Level Vulnerability Assessment	8
B.	On-Going Projects	8
1)	DST Project: Establishing/Strengthening the State Climate Change Centre/Cell Under NMSKCC (SCCC-NMSKCC) in the State of Karnataka.	8
	a) Sub project 1: Strategic Knowledge web-portal for Climate Change	8
	b) Sub project 2: Microbiological studies on forest soils of Permanent Preservation Plots (PPPs)	9
	c) Sub project 3. Assessment of Carbon Stock in Permanent Preservation Plots of Bannerghatta National Park and Doresanipalya Forest, Karnataka India	9
	d) Sub project 4: Leaf area Analysis for selected species at Permanent Preservation Plots	9
	e) Sub project 5. Phenological studies on selected tree species of Thalewood house, Bugurikallu and Doresanipalya permanent preservation plots at Bannerghatta National Park	10
	f) Sub project 6. Photosynthetic potential of some important tree species in permanent preservation plots of Bannerghatta National park and Doresanipalya forest	10

Table of Contents		
	g) Sub project 7. Nutrient Analysis of the forest soil in PPPs	10
	h) Sub project 8. Re enumeration and biometrics of the flora in the Permanent Preservation Plots at Bannerghatta National Park	11
	i) Sub project 9. BIA enabled Butterfly monitoring program for Karnataka	12
	• Butterflies as Climate Change Indicators – A study in different Eco- climatic Zones of Karnataka –Phase II	12
2)	GoK Funded Projects Initiated in 2020-21	12
	i. Understanding and projecting the effect of climate change on native bee species and its implication on crop production	12
	ii. Studies on plastic degrading microbes isolated from soil	14
	iii. Mapping of Important Green House Gases (GHGs) in Selected BBMP Areas of Bengaluru City	14
	iv. Promoting Green Buildings To Combat Climate Change: A Study Of Bengaluru - by ISEC	15
	v. Understanding Institutional Initiatives (Civic) in Solid Waste Management – A Study of Bengaluru city	15
	vi. A study of heavy metal concentration in vegetable crops irrigated by different sources of water	15
	vii. Enhancement of carbon dioxide fixation using microalgae for improvement of biomass production – A pilot scale study	15
	viii. Estimation of photosynthetic potential of dominant mangrove species in different osmotic environment	15
	ix. A revisit to the Long Term Research Sites (LTRS) in tropical forests of Karnataka – An assessment and compilation of available data and revival of select sites	15
	x. Exploring the potential of terrestrial indoor plants for moderating the effect of climatic conditions in urban areas	16
	xi. Understanding anthropogenic impact on bee pollinators: A study under different cultivation practices and changing land-use pattern	16
	xii. Carbon neutral government institute: A pilot project to achieve carbon neutrality for Karnataka, India	17
	xiii. The Study of Environmental carrying Capacity of Udupi Taluk	17
	xiv. Impact of Climate Change on Sericulture in Karnataka and Implementation of Adaptation and Mitigation Technologies at Farmers Level	17
	xv. Green Index Portal	17
	xvi. Identification and Quick Response (QR) coding of trees of Kadugodi tree park	18
II.	Assignments by MoEF&CC, Govt. of India	19
	1. Revision of Karnataka State Action Plan on Climate Change	19
	2. Training for IFS officers	19
III,	Coordination with Government Departments for Developing Projects under National/International Funding	19
	a) Monitor the NAFCC Project Undertaken by AH&VS	19
IV,	Workshop/ Seminars/ Conference Conducted/Attended by Climate Change	19

Table of Contents		
	Researcher	
V.	Research Publications	20
2.2.3.	Impact Assessment of Downhill Pipe Conveyor on Ambient Environment	21
	I. Background Information	21
	II. Objective of the project	21
	III. Progress (up to 31st March 2021)	22
	IV. Advisory Committee	24
	V. Procurement of Instruments	24
	VI. Socio-Economic Form	24
	VII. Data Collected	24
	VIII. Budget	25
2.2.4.	Impact of Air Pollution of Bengaluru Metropolitan Transportation Corporation (BMTC) Crew	25
2.3.	Quality Assurance Cell (QAC)	26
2.4.	Laboratories	26
	1. National Accreditation Board for Testing and Calibration Laboratories (NABL)	26
	2. The Environment (Protection) Act, 1986	26
	3. National Accreditation Board for Education and Training (NABET)	26
	4. Water Analysis Laboratory	26
2.5.	Outreach Activities	28
2.5.1	Environmental Information System (ENVIS) Centre;	28
	a) ENVIS Website	28
	b) Indian State Level Basic Environmental Information Database (ISBEID)	28
	c) ENVIS Newsletter 'PARISARA'	28
	d) National Environment Survey (NES) - Grid Based Resource Information Decision Support System (GRIDSS)	29
	e) EMPRI Library	29
	f) Green Skill Development Programme(GSDP) Courses	30
	g) Other Activities conducted by ENVIS Centre along with Host Institution EMPRI	30
	h) The centre has created knowledge products and the data bases	32
2.5.2	National Green Corps	32
	A. NGC Programme during 2020-21	33
	B. Details of the Programmes/Activities for the year - 2020-21	34
	1. Environment Days Celebration	35
	2. Important Days Celebrations	36
	3. Activities under Swachhta Action Plan (SAP)	37
	4. Cleaning & Awareness Activities at Coastal Beaches	41
	5. Awareness Programmes	42
	6. Training Programmes under NGC Programme	45
	7. Meetings	47
	8. Other Initiatives	48
	9. Achievements	48
	10. NGC Team's Visit to Schools: NGC team of EMPRI visited total of 1700	48

Table of Contents		
	schools from all 34 educational districts	
	11. Photo Gallery –National Green Corps	49
CHAPTER 3	HUMAN RESOURCES	55
3.1	Officers on Deputation from Government of Karnataka and Karnataka State Pollution Control Board	55
3.2	EMPRI Fellow	
3.3	Details of outsourced employees-2020-21	55
3.3.1.	Employees Have Been Outsourced Through Manpower Agency for Carrying Out Various Projects as On 31 st March, 2021.	55
3.3.2.	Employees Have Been Outsourced Through Manpower Agency for the Office Management as on 31 st March, 2021	56
3.3.3.	Number of employees who have resigned from the service of EMPRI /worked part time for short term period	57
3.4	Auditors	57
Annexures		
Annexure - 1	Governing Body Committee Members	58
Annexure - 2	Executive Committee Members	59
Annexure - 3	Research & Training Advisory Committee Members	59
Annexure - 4	Selection Committee Members	60
Annexure - 5	Internship Committee Members	60
Annexure - 6	Technical Advisory Panel Members	60
Annexure - 7	Annexure- 7: Internal Complaint Committee: [Under Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act 2013]	61
Annexure - 8	Trainings/Workshops Conducted During the Year 2020-21	61

CHAPTER 1.

ABOUT THE INSTITUTE

1.1. Constitution

The Environmental Management & Policy Research Institute (EMPRI) is an autonomous institute established by Government of Karnataka on 17th September 2002 under the Department of Forest, Ecology and Environment. The Institute undertakes applied and policy research and also endeavours to provide capacity building trainings on concurrent environmental issues relevant to the society. Services provided by the institute seek to encourage and enable government, industry and civil society to safeguard and manage the natural resources effectively. It is registered under the Karnataka Societies Registration Act, 1960.

1.2 Vision

The EMPRI's vision is to become a knowledge centre inspiring and enabling society to create an environment of harmony between man and nature.

1.3 Mission

1. To carry out research on current policy and environmental issues.
2. To provide world class training and advisory services on environmental management.
3. To enable and encourage the civil society, the government and the industries to safeguard and manage natural resources effectively.

1.4 Objectives

1. To provide Capacity Building & Technical support to Government, Non-Government & other Institutions in addressing policy and environmental issues.
2. To provide Consultancy Services to Industries, Government Departments and other organizations in the field of Environmental Management.
3. To take up studies and to develop policy documents on various environmental aspects.

1.5 Functions

1. To contribute towards the protection and management of Environment & Ecology through Scientific, Technical, Policy research & other activities.
2. To assist the Government Departments, Non-Government Organisation (NGO) and Public at large in performing the mandatory functions specified in the various environment laws, guidelines and judicial pronouncements from time to time and to assist the concerned agencies in setting up norms.
3. To undertake/develop studies and research in the field of environment protection and conservation for improving the overall quality of environment.
4. To develop expertise in the field of environmental research and to develop into world-class consultants and to act as a referral institute.
5. To interact and/or to seek affiliation with national and international agencies working with similar objectives.

6. To undertake training and human resources development in the field of environment and by organizing seminars/workshops and other programs for stakeholders.
7. To print, publish, exhibit books, pamphlets and periodicals, educative and informative materials that may be considered desirable for promotion of the objectives of the institute.
8. To run an ENVIS (Environmental Information System) Centre and to develop, maintain and run a reference library and data centre with books, periodicals, films, video and other audio-visual materials.

1.6 Governance

EMPRI functions under the direction of a Governing Body chaired by the Additional Chief Secretary, Department of Forest, Ecology & Environment, Government of Karnataka. The Governing Body consists of representatives of various Government Departments and Government Authorities including Department of Forest, Ecology & Environment, Department of Urban Development, Department of Industries & Commerce, Department of Health & Family Welfare, Department of Finance, Central Pollution Control Board (CPCB) and Karnataka State Pollution Control Board (KSPCB). The Director General (DG), EMPRI is the Member Secretary of the Governing Body. The DG being the Chief Executive of the Institute is responsible for day-to-day administration of the organization, supported by the officers deputed from the Government of Karnataka and personnel contracted/outsourced for specific purposes.

1.6.1 General Body

General Body is chaired by the Additional Chief Secretary, Department of Forest, Ecology & Environment, Government of Karnataka. The members of Governing Body are also the members of General Body. The General Body meeting is convened every year to consider and approve the Annual Administration Report, Audit Report, Income and Expenditure Statement etc. It also approves the budget for the ensuing year.

1.6.2 Governing Body

The Governing Body (GB) of the EMPRI is constituted by Government of Karnataka, nominating senior level functionaries of various Departments. The list of members of the Governing Body committee is placed in **Annexure – 1**.

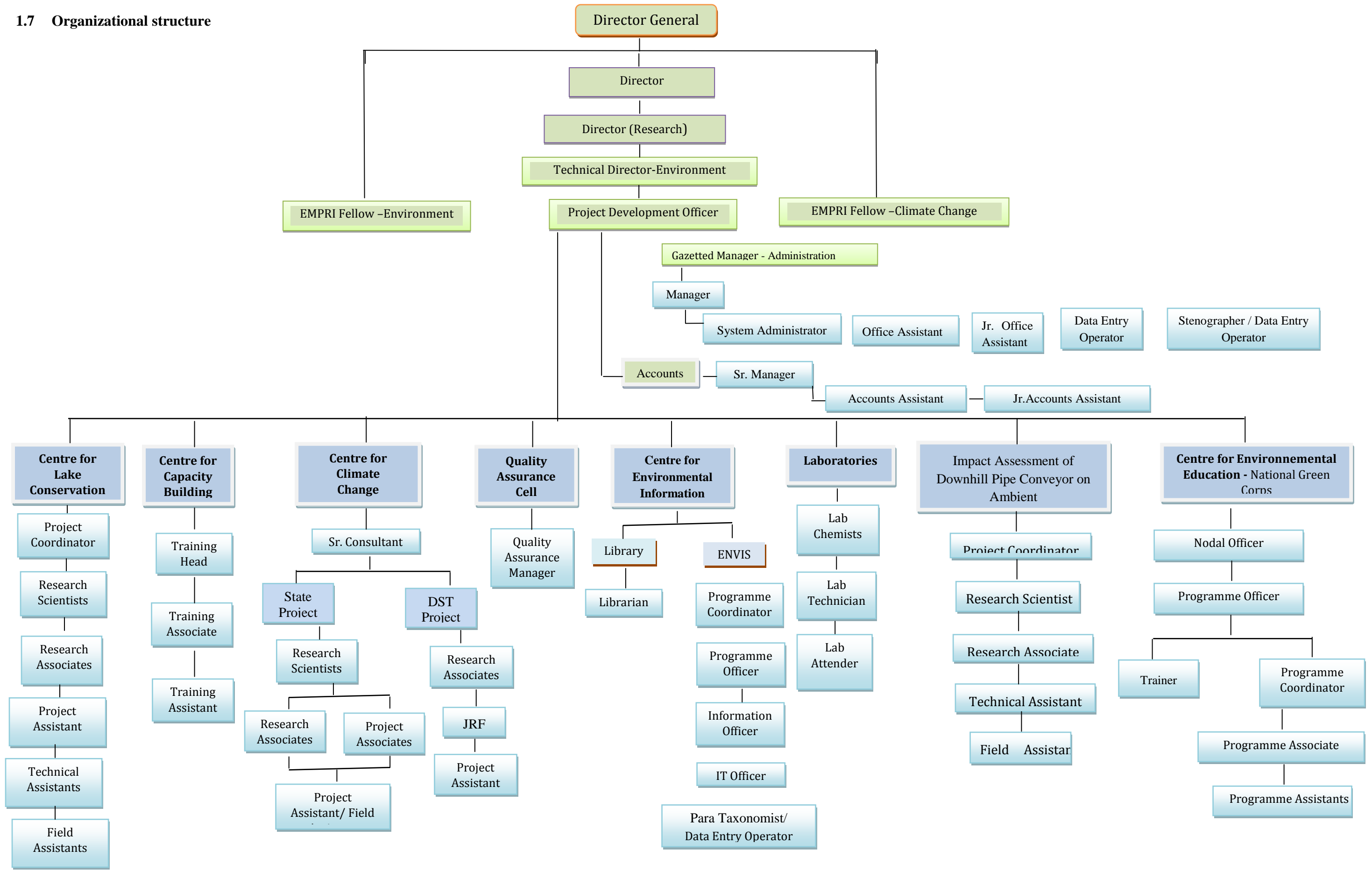
1.6.3 Committees

Following committees are constituted to advices and also to take decisions on specific matters.

1. **Executive Committee:** A five member committee constituted by the Governing Body and is chaired by the Director General. The committee advises and takes decisions on administrative and financial matters. The composition of the Executive Committee is placed in **Annexure -2**.
2. **Research & Training Advisory Committee:** The Committee is constituted as per decision taken in the 28th GB meeting and the Director General, EMPRI is the Chairman of the Committee. The Committee consists of 11 members including Govt. Officers and functionaries from eminent organizations like Institute of Social Economic Change, Karnataka Pollution Control Board, Central Pollution Control Board and University of Agriculture Science. The composition of the committee as is placed in **Annexure – 3**.

- 3. Selection Committee:** A Selection Committee, for the selection of candidates required to be filled up for various posts in EMPRI. The 23rd Executive Committee of EMPRI held on 19.09.2019 modified the composition of the selection committee. The composition of the committee is placed in **Annexure – 4**.
- 4. Performance Review Committee:** As per decision taken in the 39th GB meeting, a three member Performance Review Committee headed by Director General, Director, EMPRI and Director (Research) as members have been constituted. The committee reviews the performance of the outsourced/manpower and makes recommendation to the Executive Committee and Governing Body.
- 5. Internship Committee:** The committee is constituted as per decision taken in 40th GB meeting to select eligible graduates and post graduate students as interns. The committee is chaired by the Director General, EMPRI and comprises of three other members. The composition of the committee is placed in **Annexure – 5**
- 6. Training Evaluation Committee:** The EMPRI takes up training activities on various environmental issues and a four member committee has been constituted to evaluate the training programmes conducted by EMPRI. The committee is chaired by the Director, EMPRI and Director (Research) EMPRI, Shri. T. Mahesh, Sr. Environmental Officer, Karnataka Pollution Control Board, Bangalore and Technical Director-Environment, EMPRI (Concurrent Charge) and Project Development Officer, EMPRI are the members.
- 7. Technical Advisory Panel:** A Technical Advisory Panel (TAP) has been constituted for according approval of configuration of Computer Hardware/Software required to be purchased for EMPRI. The Director General, EMPRI is the Chairman and comprises of five other members. The composition of the committee is placed in **Annexure – 6**.
- 8. Internal Complaint Committee:** The Committee is constituted under Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act 2013. The Committee consists of 11 members. The composition of the committee as is placed in **Annexure – 7**

1.7 Organizational structure



CHAPTER 2. MAJOR ACTIVITIES

2.1 Centre for Capacity Building – Training/Workshop

Government of Karnataka has nominated EMPRI as the Nodal Agency and accorded permission to establish a Climate Change Cell in the Institute during 2015. With the financial assistance of Government of Karnataka EMPRI has taken up Research studies and Capacity Building Programs in Climate Change for officers of various departments.

- a) During the year 2020-21, a total of **138** online and Offline training programmes were organized due to COVID-19 situation and **8130** Participants have been trained. Training on Plastic Ban Notification 2016, Waste Management Rules -2016, Environmental laws & Compliance, Phyto Remediation & Climate Change have been organized. Further, under the hon'ble chief minister skill development program offline training on Waste Water treatment plant- technician is also organized for unemployed youths. The details are given in **Annexure -8**.

b) Photo Gallery



2.2 Research Programmes

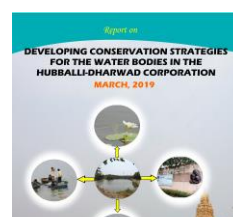
The EMPRI conducts research on concurrent environmental issues of immediate relevance for the society. In every case, research carried out identifies problems, determines underlying causes and proposes measures to mitigate them. In the year 2020-21 research work carried out at EMPRI included the following:

2.2.1. Centre for Lake Conservation

1. Developing Conservation Strategies for the Water bodies in Huballi Dharwad Municipal Corporation (HDMC)

Environmental Management and Policy Research Institute (EMPRI), Bengaluru, under the financial assistance from Centre for Infrastructure, Sustainable Transportation & Urban Planning (CiSTUP), IISc., Bengaluru, has completed the above entitled study and has submitted English and Kannada reports to the funding department and also to the concerned government departments

The above study has addressed the present status of the 101 inventorized water bodies (54 existing and 47 disused); preparation of the water bodies database (including Kere, Katte & Kunte); land use and land cover changes analysis over the time period using Geographic Information System application; Unique Identification Code (UID) for all water bodies; Identification of pollution sources, encroachments; Physico-chemical analysis and biodiversity documentation, Estimated economic value of the major lakes; preparation of Lake Health Card. During the study an effort has been made to understand the present status of the water bodies in the study area in a holistic manner, for formulating conservation strategies which would help the Policymakers, administrators and the stakeholders to look into the integrated management of the water bodies.



2. Documentation of the Yettinahole Project Sites and Assessment of Cumulative Impact of Multiple Projects in a Forested Landscape

The Government of Karnataka (GoK) through Karnataka Neeravari Nigama Limited (KNNL) has taken up Yettinahole drinking water project in Hassan district, Karnataka.

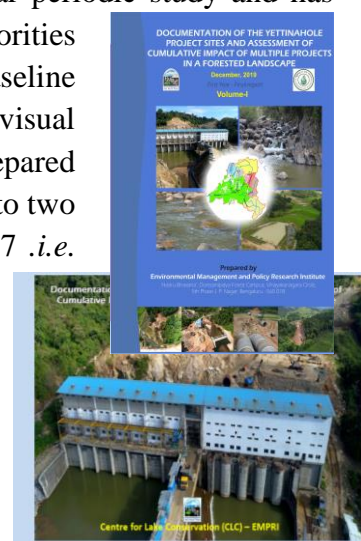
The main aim of the Yettinahole drinking project is to lift 24.01 TMC of water during rainy season from Yettinahole, a west flowing stream near Sakleshpura in Hassan District by constructing eight weirs across its tributaries and conveying water to the eastern plains districts of the Karnataka State such as Kolar, Chikkaballapura, Ramanagar, Bangalore rural, Tumakuru, parts of Chikkamagaluru and Hassan for drinking water purpose. The project is designed to quench the thirst of nearly 7 million people. Out of 24.01 TMC lifted water, 15.029 TMC will be utilized for the drinking water supply and the remaining 8.967 TMC will be used for filling up the Minor Irrigation tanks for ensuring ground water recharge.

The said project involves diversion of 13.93 Ha of forest land in Sakleshpura forest area, in respect of which the predecessor of Visvesvaraya Jala Nigam Limited (VJNL), Karnataka Neeravari Nigam Limited (KNNL), has obtained the stage-1 Forest clearance from Ministry of Environment, Forests and Climate Change, Government of India (MoEF&CC) by imposing certain stipulated conditions. For accomplishing the imposed stipulated conditions the Visvesvaraya Jala Nigam Limited, Government of Karnataka, approached Environmental Management and Policy Research Institute, Bengaluru, to take-up study on two following conditions and submit a report in regard to environmental aspects.

Condition No. 26. In order to benchmark the present status of ecology in the project area and particularly the project work-sites survey and videography based study may be instituted at the cost of user agency. This will facilitate monitoring of project sites and decision making in future.

Condition No. 27. Periodic assessment of cumulative impact of multiple projects in a forested landscape by the regulatory authority. It allows an adaptive management in the landscape and an opportunity to evaluate and realign the mitigation strategies.

As per the above conditions, EMPRI has completed first year periodic study and has submitted the report to the concerned Government departments/authorities as well as to funding Department. Based on the collection of baseline environmental data, secondary data, project DPR report and also visual observations made during the field visits, the report has been prepared confined to the two conditions. The entire report has been compiled into two Volumes. The Volume-I outlines the findings of the Condition No.27 *i.e.* impacts assessment of the individual project that are contributed to the cumulative effect on forested landscape ecosystems in the combined catchment area of Kempuhole. Whereas, Volume-II outlines the Condition No.26 *i.e.* present ecological status of Yettinahole project working sites which has been documented through DRONE photography and videography.

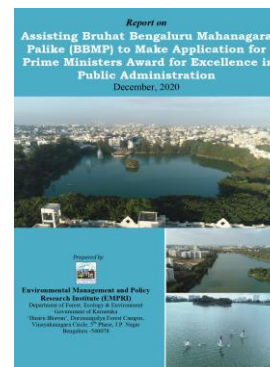


Further, as per the scope of the study, for continuous monitoring to course correction and realign the impacts on the surrounding ecosystem of the combined Kempuhole catchment area due to Yettinahole drinking project and other projects. Second year periodical cumulative impact assessment was undertaken by monitoring various environmental components seasonally in the field. Based on these baseline data preparation of report is under progress.

3. Assisting Bruhat Bengaluru Mahanagara Palike (BBMP) to Make Application for Prime Ministers Award for Excellence in Public Administration

Government of India has instituted an above scheme to acknowledge, recognize and reward the extraordinary and innovative work done by District/organization of the Central and State Governments. In this context, for recognition of the work at national level, BBMP which has done exemplary work in rejuvenation of urban lakes in the city of Bengaluru. EMPRI assisted BBMP in applying application for the above said scheme to the web portal of Department of Administrative Reforms & Public Grievances

<https://pmawards.gov.in/> in the stipulated timeline. After completion of the work EMPRI has submitted the report to the funding department.



2.2.2. Centre for Climate Change

EMPRI, the nodal agency for climate change in Karnataka, boosted its research activities and programs on climate change in 2020-21 with the support of Government of Karnataka, in addition to the ongoing research activities under the DST project. Independently and also in collaboration with other research institutions like IISc., ISEC, CSTEP, UAS and KSSRDI many research projects were undertaken some of which are completed and others are ongoing in the Centre for Climate Change.

I. Research Activities

A. Completed Projects

1. Vulnerability Profile of Karnataka State: District Level Vulnerability Assessment

The objectives of the study are to develop the vulnerability index and vulnerability ranking for the different districts of Karnataka. Nineteen indicators under the four sub-categories namely; Socio-economic & livelihood, Institutional and infrastructure, Biophysical and Health were considered for the study. The highest vulnerability index was for Chikballapur (0.728) and the lowest value was of Kodagu district (0.492). The vulnerability indices of the thirty districts in Karnataka were within a range of 0.492 to 0.728 with no district having an index value of less than 0.4.

B. On-going projects

1. DST project: Establishing/Strengthening the state Climate Change Centre/Cell under NMSKCC (SCCC-NMSKCC) in the state of Karnataka

a) Sub project 1: Strategic Knowledge web-portal for Climate Change

A Strategic Knowledge web-portal is developed and maintained by the EMPRI to strengthen the research related repository for climate change. The strategic knowledge portal is developed and is hosted in the KSDC server and is vigorously monitored. Currently the web-portal is undergoing the change of template since the existing template was private and now it is transferred to the GoK, authorised template by the Centre for smart Governance, government of Karnataka. The web-portal is very robust and can withhold high volume information, research papers and information from various research centres and institutes. The Web-portal is also as a mirror to the latest climate change related projects and programs

undertaken by the institute and is proposing dynamic up-gradation by including live discussion forums on climate change.

b) Sub project 2: Microbiological studies on forest soils of Permanent Preservation Plots (PPPs)

A study on microbial analysis to understand the bacterial/fungal population and vesicular arbuscular mycorrhizal (VAM) fungal spore distribution was conducted in three Permanent preservation plots established in Bannerghatta forest and Doresanipalya forest in Bengaluru, Karnataka. The soil samples were tested for the presence of general bacteria, actinobacteria, fungi, *Pseudomonas* sp., *Azotobacter* sp. and phosphate solubilizing bacteria (PSB) on respective growth media. The results indicated that the general bacterial count recorded the highest number followed by *Pseudomonas* sp., Actinobacteria, Fungi, *Azotobacter* sp. and PSB as shown in the table below. The results on average VAM spore count of each one hectare plot indicated that the Doresanipalya plot had higher VAM spore number with 41.2 spores per ml followed by Bugarikallu plot (36.71 spores per ml) and Thalewood house plot (21.5 spores per ml). The second seasonal analysis of the soil sample is under progress.

c) Sub project 3. Assessment of Carbon Stock in Permanent Preservation Plots of Bannerghatta National Park and Doresanipalya Forest, Karnataka India

Quantifying carbon stock in natural forests is crucial in planning the management of such ecosystems for their conservation and studying their role in the mitigation of the effects of climate change. Above and belowground carbon storage potential in different vegetation types of Permanent Preservation Plots (PPP) established in 2017 at Bannerghatta National Park and Doresanipalya forest were assessed. Thalewood house represents moist deciduous forest, Bugarikallu PPP represents drier forest with thorny scrub stunted trees and Doresanipalya PPP represents dry deciduous disturbed forest. Allometric equations are used to estimate the amount of carbon in above-ground biomass, taking the total height (H) and the diameter at breast height (DBH) of trees whose DBH is equal to or greater than 1 cm. Carbon content in soil collected at 0-30cm depth is being estimated using CHNS elemental analyser. Above ground biomass/carbon estimations of trees for the current year are under progress. The soil carbon concentrations of Thalewood House and Bugarikallu PPPs for the year 2019 (summer) were found to be 1.79% (± 0.54), 1.21% (± 0.67) respectively and for the year 2020 (winter) 2.65% (± 0.01), 1.48% (± 0.01) respectively. The obtained values are evident to project that seasonal variations play a major role in carbon stock increment.

d) Sub project 4: Leaf area Analysis for selected species at Permanent Preservation Plots

The leaf area directly relates to the process of photosynthesis which in turn has a great impact on the growth of plant, respiration, evapotranspiration, carbon accumulation and biomass production. Specific leaf area is the ratio of leaf area to the leaf dry mass, the reverse of which gives the leaf mass per area. The correlation of specific leaf area with the photosynthetic activity of plants helps in understanding the biomass production capability of particular species. Leaf area analysis of six species at Doresanipalya forest (*Pterocarpus marsupium*, *Diospyrus melanoxylon*, *Santalum album*, *Shorea talura* and *Ochna obtusata*) and five species each at Thalewood house (*Olea dioica*, *Syzygium cumini*, *Cassia fistula*, *Ciphadesa basifera* and *Glochidion velutinum*) and Bugarikallu plot (*O. obtusata*, *Maytenus emarginata*, *Ixora nigricans*, *Stereospermum suaveolens* and *Soymida febrifuga*) were conducted in winter of 2020. It was found that the highest SLA was recorded by *Santalum album* 168.14 cm² /g, *Ciphadesa basifera* 235.94 cm² /g and *S. suaveolens* 110.72 cm² /g at Doresanipalya, Thalewood house and Bugarikallu respectively.

e) Sub project 5. Phenological studies on selected tree species of Thalewood house, Bugurikallu and Doresanipalya permanent preservation plots at Bannerghatta National Park

Community level phenological studies have been taken up in BNP and DRF. For conducting the phenological studies, 556 trees were tagged around the 1-ha PPPs in Thalewood house, Bugurikallu, and Doresanipalya (254 in Thalewood house locality, 250 in Bugurikallu locality, and 52 in Doresanipalya locality). The trees so tagged were mostly representative of the plants at the 1-ha permanent preservation plots. The tagged plants of Thalewood house comprised of 67 species whereas Bugurikallu and Doresanipalya comprised of 67 and 21 species respectively. Totally 96 unique species in all the three localities are being observed.

Phenological observations data				
Sl.No.	Description	Thalewood house locality	Bugurikallu locality	Doresanipalya locality
1.	Total individuals tagged	254	250	52
2.	Number of species	67	67	21
3.	Number of soil sampled	10	10	5
4.	Monthly phenology observations completed	17	19	20
5.	Monthly soil sampling completed	15	16	16

Phenological observations of the tagged trees have been completed for 17, 19, & 20 months in Thalewood house, Bugurikallu, and Doresanipalya localities (above table). The phenological observations will continue so that changes in phenophases over a period of time can be analyzed taking into account other weather data parameters. In addition to the phenological observations, soil samples have also been collected for estimating the soil moisture content. The Phenological observations will help us in a) Understanding the timing of ecosystem processes b) Understanding the community level phenological pattern c) Assessing the vulnerability of species to climatic variations and c) Relating phenological changes with the climatic factors to establish the effect of climate change on trees.

f) Sub project 6. Photosynthetic potential of some important tree species in permanent preservation plots of Bannerghatta National park and Doresanipalya forest

We determined the Leaf CO₂ assimilation (A)/photosynthetic characteristics of 9 important tree species in different vegetation types of Permanent Preservation Plots (PPP) established at Bannerghatta National Park (BNP) and Doresanipalya forest. The Leaf CO₂ assimilation/photosynthetic characteristics of *Cassia fistula* and *Shorea roxburghii* were significantly higher and ranging from 2.4-21.8 $\mu\text{mol photon m}^{-2}\text{s}^{-1}$ in moist deciduous forest and dry deciduous forest of Thalewoodhouse PPP and Doresanipalya PPP. Whereas, in the species of *Ixoranigricans*, *Maytenusemarginata*, *Olea dioica* and *Glochidionvelutinum*, it ranged from 1.7-16.5 $\mu\text{mol photon m}^{-2}\text{s}^{-1}$. Photosynthesis of above mentioned species appears to be more strongly affected by stomatal conductance in relation to temperature in the dry forest of PPP than in the moist forest of PPP.

g) Sub project 7. Nutrient Analysis of the forest soil in PPPs

The soil samples were collected from the 25 subplots of each of the 1-hectare Permanent Preservation Plot at Doresanipalya forest (dry deciduous and disturbed) and Bannerghatta National Park i.e., Thalewood house (moist deciduous) and Bugurikallu (dry deciduous). The soil processing has been carried out for the estimation of the physico-chemical parameters.

h) Sub project 8. Re enumeration and biometrics of the flora in the Permanent Preservation Plots at Bannerghatta National Park

Permanent Preservations Plots (PPPs) of 1-ha size (100 m x 100 m) were established during 2017-18 to study the plant diversity, forest structure & dynamics in the light of climate change. Totally three plots were established, two in Bannerghatta National Park (Thalewood house & Bugurikallu) and one in Doresanipalya Reserve Forest (Doresanipalya).

Census: All the woody individuals > 1 cm diameter at breast height (dbh) was identified to species, diameter & height measured and were tagged with unique numbers. The spatial location of each individual was accomplished by noting the x- and y-coordinates. A database of the three PPPs comprised of the Tag number, scientific name, Family, x- and y- coordinates, gbh/dbh& height. Thalewood house plot had 1586 individuals (below table) comprising of 68 species, Bugurikallu had 2165 individuals comprising of 76 species and Doresanipalya plot had 2087 individuals comprising of 45 species. Bugurikallu plot had the most number of species occurring in 35 families followed by Thalewood house plot and Doresanipalya plot.

Census data				
Sl. No.	Description	Thalewood house plot	Bugurikallu plot	Doresanipalya plot
1.	Total individuals tagged	1586	2165	2087
2.	Species found among all individuals	68	76	45
3.	Families found	28	35	20

Re-census: Re-census involves the re-measurement of the previously tagged individuals in a PPP after a period of 2 years. The re-census involved 3 main components viz.

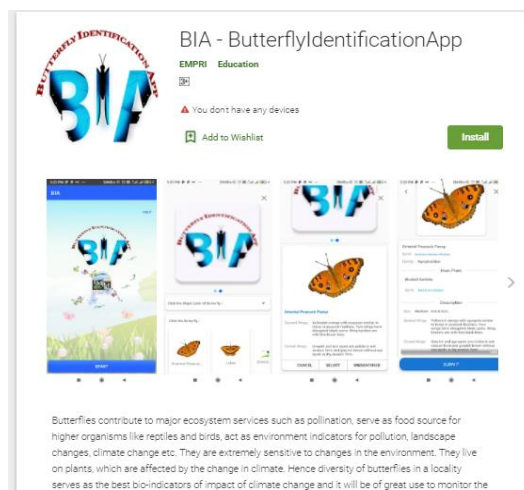
1. Re-measurement of surviving tagged individuals.
2. Mortality studies and
3. Recruitment of new individuals that are >1cm dbh.

Re-census was completed in all the three plots during 2019-20. Doresanipalya plot had the highest mortality rate (below table) among the tagged individuals compared to Bugurikallu and Thalewood house plots. Doresanipalya plot also had the highest recruitment seen among the three plots with a recruitment rate of 19%. In Doresanipalya plot 199 tagged individuals were destroyed inadvertently due to plantation work adjacent to the plot. The new species that were tagged during the recensus were *Clematis gouriana* in Thalewood house plot; *Spathodeacompanulata* & *Simaroubaglauca* in Doresaipalya plot.

Recensus data				
Description		Thalewood house plot	Bugurikallu plot	Doresanipalya plot
Mortality	Individuals - Dead	92	109	129
	Percent Mortality	5.8%	5.0%	6.2%
Recruitment	New individuals - tagged	303	286	473
	Percent Recruitment	17%	12%	19%
	New species	1	0	2

i) Sub project 9. BIA enabled Butterfly monitoring program for Karnataka

As a pioneering effort, the Strategic Knowledge Centre for Climate Change in EMPRI has initiated a **Butterfly monitoring program for Karnataka**. Monitoring involves the identification and reporting of butterflies in different districts of the state. We have prepared simple easy to use field guides for Bengaluru/ Karnataka butterflies. A mobile App (**BIA- Butterfly Identification APP**) is developed by EMPRI for the double purpose of helping in field identification of butterflies and sending the information to EMPRI. BIA is linked to EMPRI website and also the Karnataka Climate Change Strategic knowledge portal. The dashboard developed for processing the butterfly data is hosted in Karnataka State Data centre (KSDC) and shall be accessible to everyone interested to know the details. The program is to be promoted across all districts of Karnataka through identified nodal agencies (NGC schools and Range Forest Offices). If executed meticulously, this will be the first of its kind in the country to monitor the diversity of butterflies and to use them as bio indicators of climate change. Butterfly Identification App (BIA) prepared for facilitating the BMP is now hosted in the Google play store and is available for public to download in their mobile phone.



▪ Butterflies as Climate Change Indicators – A study in different Eco- climatic Zones of Karnataka –Phase II

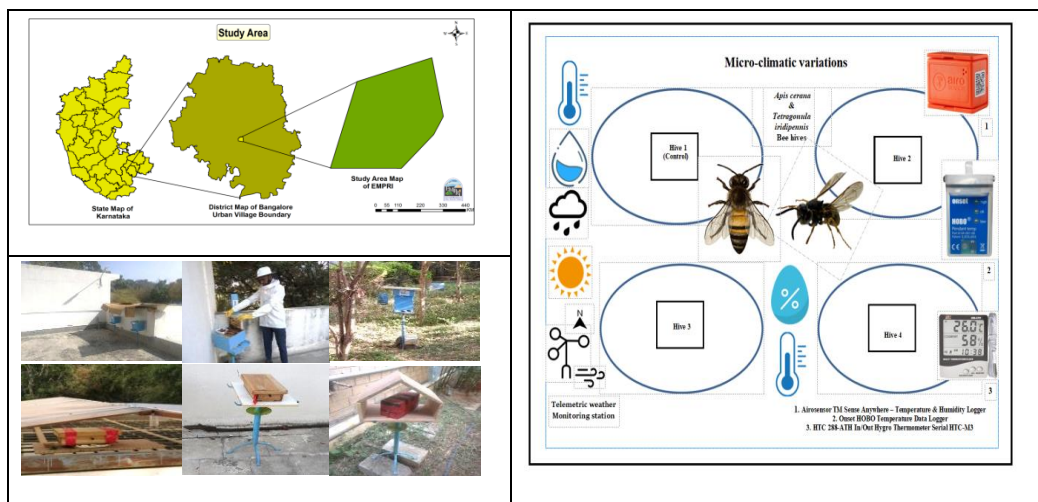
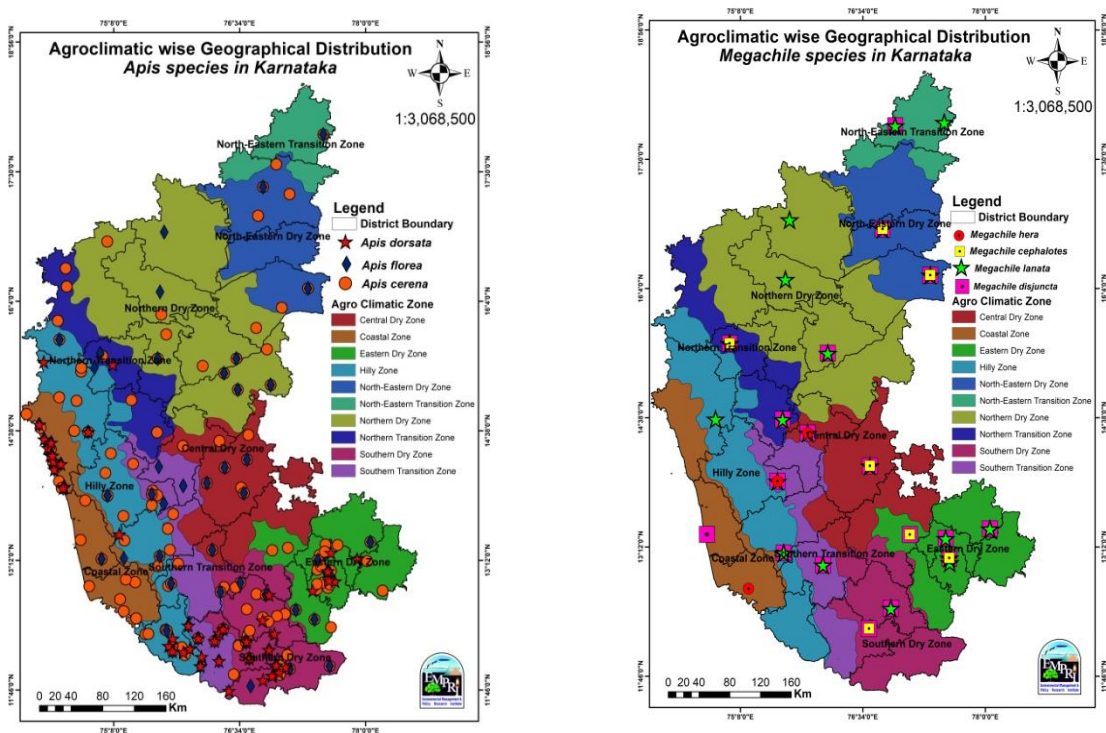
Field work was carried out in different eco-climatic regions of Karnataka- Bangalore, Dharwad, Gulbarga and Mangalore. The study was conducted from February 2020 and due to Covid pandemic, all areas could not be surveyed. The seasons were taken as summer (February to May), Rainy (June to September) and Winter (October to January). Field work was carried out in each month where individual species of butterflies and their numbers were recorded within 2.5m on both sides of the transect line and 5m above the eye level height. A total of 79 species were found in Gulbarga in three seasons (Summer, Rainy and Winter), 54 species in Mangalore in three seasons (Summer, Rainy and Winter), 64 species in Bangalore in two seasons (Summer and Rainy), and 49 species in Dharwad in Summer season.

2. GoK Funded Projects initiated in 2020-21

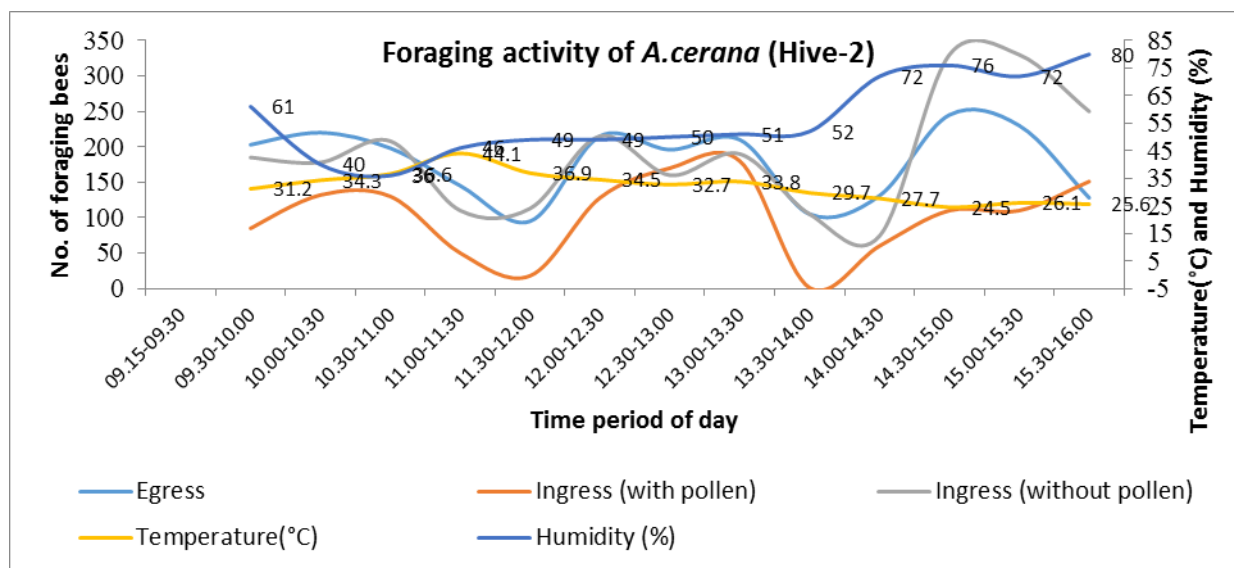
i. Understanding and projecting the effect of Climate Change on Native Bee Species and its Implication on Crop Production

This study is aimed to assess the impact of climate change on native bees. Initially, the district and agroclimatic zone wise geographic distributional maps for 3 to 4 species under each genus: *Apis*, *Halictus*, *Ceratina*, *Megachile* were prepared from secondary data. The decadal analyses for three species under the genus *Apis* species for 1961 to 2020 were completed. The foraging activity of

Tetragonulairidipennis and *Apis cerana* were studied from September, 2020 to March, 2021. The aim of the study was to understand the response behaviour of native bees under different microclimatic natural conditions. Second, determine how outer environmental conditions via., abiotic factors (temperature, humidity, wind, solar radiation) affect the ability of native bee species to regulate the temperature and humidity within the hives using real-time monitoring and third, evaluating the relationships between bee activity and climatic variables. The climatic modulation studies to understand the egg laying capacity of the queen under controlled experimental condition is ongoing.



a) Map of study area and selected weather station b) images of the colonies placed under different natural conditions for *Apis cerana* and *Tetragonulairidipennis* for experiments c) Experimental design depicting micro-climatic variations.



a) Temperature and humidity variations inside native beehives (*A. cerana* and *T. iridipenis*) b) Foraging activity of *A. cerana* for Hive -2.

ii. Studies on Plastic Degrading Microbes Isolated From Soil

The specific objectives of the project are to isolate the plastic degrading microbes *viz.*, Bacteria and Fungi, from soil samples, to characterize the microbes for their efficiency in the degradation of one time use grade plastic, to study the effect of biodegradation of plastic under *in vitro* and *in vivo* conditions and to develop a microbial control package to degrade plastic in the dumping sites. A survey was conducted in South Bangalore for the collection of soil samples from three different sources *viz.*, Garden, Forest and Plastic dumping sites. Accordingly, the soil was collected from EMPRI garden, Bannerghatta forest and Puttenahalli lake in Bangalore. A total of five microbial isolates (bacteria-3no. and fungi-2no.) tested for plastic degradation capability by weight loss method at in-vivo and in-vitro conditions for the time intervals of 20 days, 40 days and 60 days. These five isolates have shown the degradation of up to 12-20%. Molecular identification of the five isolates is under progress.

iii. Mapping of important Green House Gases (GHGs) in selected BBMP areas of Bengaluru City

The outdoor air quality monitor for estimation of GHGs was procured from Airveda, New Delhi. The parameters such as CO₂, temperature, humidity, PM_{2.5} and PM₁₀ are estimated. The 24-hours air sampling in the designated locations of the KSPCB monitoring stations have been initiated and compilation of data is under progress.

iv. Promoting Green Buildings to Combat Climate Change: A Study of Bengaluru - By ISEC

The objectives of the project are to document and create a database on green buildings/typology in Bengaluru and analyse the role of institutions in promoting green buildings/architecture. The green buildings in Bengaluru across the categories like apartments, individual homes, office spaces and commercial establishments from the green building certifying agencies/bodies and eco-friendly architects like GRIHA, LEED, IGBC and BIOME have been identified and shortlisted for the on-field documentation of the same. Google surveys have been initiated for selected categories of establishments. Currently, field work is under progress.

v. Understanding Institutional Initiatives (Civic) in Solid Waste Management – A Study of Bengaluru city

The objectives of the project are to document the various civic initiatives in Bengaluru city across all stages (segregation, collection, transportation, treatment and disposal) with zero waste management principle in a circular economy context. The lists of Residents Welfare Association (RWA's), Self-help groups and NGO's have been shortlisted. The field visit to document the various initiatives by the RWA's in different wards of Bengaluru city is under progress.

vi. A study of heavy metal concentration in vegetable crops irrigated by different sources of water

To estimate the concentration of heavy metals in vegetables obtained from retail hypermarkets and local markets, terrace gardens and treated, untreated waste sites and to estimate the associated health risk in adults due to consumption of metal laden vegetables through a questionnaire based survey. The study area would constitute the urban and rural areas of Bangalore city. Decision for selection of laboratory to estimate the heavy metal concentration is under progress.

vii. Enhancement of carbon dioxide fixation using microalgae for improvement of biomass production – A pilot scale study

The aim of the project is to assess the potential of Microalgae for Carbon capture, Biomass accumulation and Bioremediation. The equipment of orbital shaker incubator and vortex machine are purchased under the project. The preparation of the micro algal cultures is under progress.

viii. Estimation of photosynthetic potential of dominant mangrove species in different osmotic environment

The objective of this study is to investigate the photosynthetic performance of mangrove leaves under different salinity gradients, viz., low, medium, and high salinity regions of the riverine systems of the Udipi district in Karnataka. The regions with significant mangrove vegetation were identified in the 5 coastal Taluks of Udipi districts: Byndoor, Kundapura, Brahmavara, Udupi, and Kapu. Preliminary photosynthetic ability of some mangrove species was performed from the selected regions and the collected water samples were processed for laboratory analysis.

ix. A revisit to the Long Term Research Sites (LTRS) in tropical forests of Karnataka – An assessment and compilation of available data and revival of select sites

A 6-months project on the visit to and collection of available data on Long Term Research Sites (LTRS) in tropical forests of Karnataka was undertaken. This comprised of collection of available data on Linear Tree Increment plots (LTI) and Biodiversity Sample Plots (BSP) from the Karnataka Forest Department (KFD). Field visits were undertaken to all the LTI plots and some BSPs to assess the status of these. Totally field visits were undertaken to 25 LTI plots in Kanara, Kodagu, and Mangalore forest circles. In addition some BSPs that were adjacent to the LTIs were also visited. Most of the LTI plots

are of size 20 m x 1600 m whereas the BSPs are of size 100 m x 100 m. There are totally 27 LTI plots that were established during early part of 19th century; locations of 22 LTI plots is known and are being monitored every 5 years whereas 1 LTI plot is submerged. The locations of 4 Hopea LTI plots are not known and there is no data on these. The monitoring of these plots involves the girth measurements of the tagged trees that are >10 cm dbh every 5 years as well as identification and tagging of new plants. The field visits to the 25 LTI plots (below table) were completed and the latest data on the girth measurements have been obtained from the KFD. The analysis of the obtained data and compilation of the final report is under process.

Field visits to LTI plots in Tropical forests of Karnataka					
Tropical Rain Forests			Moist Deciduous Forests		
<i>Wet evergreen</i>			<i>Teak & Non-Teak bearing</i>		
S.N.	Plot	Visited	S.N.	Plot	Visited
1.	Chippahole	Yes	1.	Usoda	Yes
2.	Bannadapare	Yes	2.	Shingatgeri	Yes
3.	Devimane	Yes	3.	Karka	Yes
4.	Katlekan	Yes	4.	Bailapur	Yes
5.	Kodkani	Yes	5.	Virampalli	Yes
6.	Malemane	Yes	6.	Aurla	Yes
7.	Agumbe	Yes	7.	Shiroli	Yes
<i>Hopea sites</i>			8.	Phansoli	Yes
1.	Pilarkhan	Not found	9.	Jamaga	Yes
2.	Devachalla	Not found	10.	Kulgi	Yes
3.	Nalkur	Not found	11.	Bhagawati-13	Yes
4.	Parappa	Not found	12.	Bhagawati-15	Yes
<i>Semi evergreen</i>			13.	Adikehosur	Yes
1.	Talageri	No	14.	Mainal	Yes

x. Exploring the potential of terrestrial indoor plants for moderating the effect of climatic conditions in urban areas

This study is aimed to assess the aims to monitor, calculate and predict how much carbon can be absorbed by few common indoor plant species at certain period of time under specific residential setup. The main objectives of the project are to determine the functional variability (leaf area, biomass ratio) of indoor plants to sequester carbon and estimate the diversity in their photosynthetic potential. The initial screenings of 15 potted indoor plant species were performed to test the photosynthetic ability by placing them under both natural sunlight and shade conditions.

xi. Understanding anthropogenic impact on bee pollinators: A study under different cultivation practices and changing land-use pattern

This study is aimed to determine how bee pollinators are impacted by anthropogenic activities in two different agricultural practices: conventional and organic. The secondary data on the rate of pesticide and fertilizer consumption, crop productivity, yield, area at district level between the years 1990-2018 for Karnataka were gathered. The farmers cultivating the pollinator dependent crops e.g. cucumber were contacted and field visits to collect the information on the diversity, abundance, species richness, density of bee species; amount of different types of chemicals utilized in the field, crop yield of cucumber plots at both urban and rural areas of Bangalore are ongoing. The field visits for study in organic plots and data collection are under progress.

xii. Carbon neutral Government institute: A pilot project to achieve carbon neutrality for Karnataka, India

This is a pilot project undertaken for assessing the carbon source by encompassing emissions and carbon sink as a case study in EMPRI. Scope 1 includes direct GHG emissions occurring from sources that are owned or controlled by the institution. Scope 2 emissions refer to indirect emissions generated in the production of electricity consumed by the institution. Scope 3 emissions refer to all other indirect emissions, those that are a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution. Data was collected for all three scopes for last 20 months and average emission of the institute was found to be 6310 kg CO₂/month. The main source of natural carbon sinks were estimated from trees and soil. The sequestration of carbon from trees at EMPRI was found out to be 4025 kg CO₂. It was estimated that 1.15% amount of carbon is sequestered in the soil at EMPRI within its boundaries. Currently, we are working on estimating the cost of mitigation for the institute.

xiii. The Study of Environmental carrying Capacity of Udupi Taluk

This study was assigned by Government of Karnataka, based on the directions of Honourable NGT with reference to the enhancement of the capacity of UPCL. The objective of the study is to estimate the Carrying Capacity through collection of the baseline data to collect the existing baseline data of Environmental parameters considering the industrial and other land use activities and to identify critical ecosystems and biodiversity hotspots in Udupi Taluk. The primary data on environmental parameters, assessment of land use and land cover status, identification of various ecosystems and bio-diversity hotspots, estimation of Carrying Capacity to develop the industrial siting guidelines, People's perspective survey and Preliminary analysis of water and soil samples are completed. Preliminary report has been submitted to Principal Secretary – Forest, Environment and Ecology (FEE) on 01/02/2021. Monitoring of Ambient Air Quality Standards and second stage of water and soil samples analysis is under progress.

xiv. Impact of Climate Change on Sericulture in Karnataka and Implementation of Adaptation and Mitigation Technologies at Farmers Level

The project aims to study the impact of climate change on sericulture in Karnataka through a historic data analysis and to assess the adaptation/mitigation technologies being practiced in the mulberry sericulture to combat the climatic changes. The baseline survey work has been conducted in two villages during March, 2020 in Ramanagara district. Proforma based information about the knowledge and experience of sericulturists on effects of climatic factors in the field of mulberry cultivation and silkworm rearing practices were collected. The information on sericulture production area in Karnataka and silk yields in the past 30 years have been collected from the Department of Sericulture

xv. Green Index Portal


EMPRI Conducted Green Auditing of Different Schemes in Government Departments. In collaboration with IISc, developed a Green Index Toolkit for evaluating Governmental programmes of Karnataka and Developed Green Index software by E-governance (GoK). This software has completed the three pilot testing processes and is subjected for line department testing. Once the feedback is collected the software shall be live. The software aims to rank the schemes and programs undertaken by the departments or organization with respect to the green components included in it and also the amount of contribution in reduction of carbon footprints.



xvi. Identification and Quick Response (QR) coding of trees of Kadugodi tree park

QR coding of tree species is a new way of disseminating knowledge via the digital platform. The trees of the Kadugodi park were identified and a database was done comprising of the Scientific name, Family, Common name, local name and medicinal uses. Photographs of leaves, flowers, fruits and bark were taken for easy identification and for incorporating these in the QR code database.

The public who come to the park will scan the labelled tree with their mobile phone camera. This will lead them to the details of that particular tree and its medicinal uses. The QR code is currently generated with the help of online platform, as a future undertaking, the latitude and longitude (Map) shall also be incorporated to provide unique identity to the tree/plant species. The QR code plate is designed and generated; the respective detailed information regarding the species was inspected thoroughly by the Research Associates involved in this project. This pilot project is hoped to lay more such opportunities to identify multiple tree park throughout the state of Karnataka.



DEPARTMENT OF FOREST
KADUGODI TREE PARK

ಶ್ರೀಗಂಧೆ
White Sandalwood



Species name	<i>Santalum album</i> L. ಸ್ವಾಂತಲಮ್ ಅಲ್ಬಮ್ ಎಲ್.
Synonyms	<i>Sirium myrtifolium</i> L. ಸಿರಿಯಮ್ ಮಿರ್ತ್ಯೋಲಿಯಮ್ ಎಲ್.
Family	Santalaceae ಸಾಂತಾಲೇಸಿ
Common name	Sandalwood, White sandalwood ಸ್ವಾಂತಲಮ್ ವುಡ್, ವೈಟ್ ಸ್ವಾಂತಲಮ್ ವುಡ್
Kannada name	ಶ್ರೀಗಂಧೆ, ಚಂದನ
Habit	Shrigandha, Chandana Tree ಛೇ
Flowering season	Throughout the year ಮೇಡ ದಿಂಜಿ
Native to	India ಇಂಡಿಯಾ
Medicinal Uses	Heartwood is used for the treatment of diarrhoea with blood, intrinsic haemorrhage, bleeding piles, vomiting, diabetes, poisoning, hiccups and menorrhagia ಸರಸವಾದ ರಕ್ತಸ್ತಮ, ರಕ್ತಸ್ತಮದ ಮೂವುಕ್ಕು, ಮೂವು, ಮೂವುಕಾಂ, ಮಷ್ಣ, ಅಕ್ಷುಶ ಮತ್ತು ಲೂಕು ಮೂವುಕ್ಕುಗಳಿಂದಾಗಿ ಅಪವಾದ ಅನಿಶ್ಚಿತಗೊಳಿಸಲು ಮುಂದೆ ಷ್ಣವುಬಳಸಲಾಗುತ್ತದೆ.



This project was taken up for the easy identification of trees by the public. A total of 68 trees were identified and QR code assigned to each of them. This work was completed successfully and will lead to better and easier dissemination of knowledge.

II. Assignments by MOEF&CC. Govt. of India

1) Revision of Karnataka State Action Plan on Climate Change

There were nine chapters prescribed by the Ministry of Environment, Forest and Climate Change under the Revision of State Action Plan on Climate Change (SAPCC). The designated subject experts/authors were assigned the task of drafting the chapter. All the nine chapters were submitted by authors and reviewed and edited. The chapters were abridged to make a concise report and the draft report has been submitted to the GoK for forwardal to MoEF&CC for comments and further revision.

2) Training for IFS officers

The five days of training course on “Conservation issues related to inland lakes in the country in the context of climate change” was organized by EMPRI for IFS officers from 23rd -27th November, 2021 at Bengaluru in a virtual mode. There were a total of 40 nominations from different state of India. 23 of them confirmed and attended the training course. The course was undertaken by multiple resource persons, the participants paved way for open forum discussions on the concerns of inland lake and other water bodies.

III. Coordination with government departments for developing projects under national/international funding

a) Monitoring the NAFCC Project undertaken by AH&VS

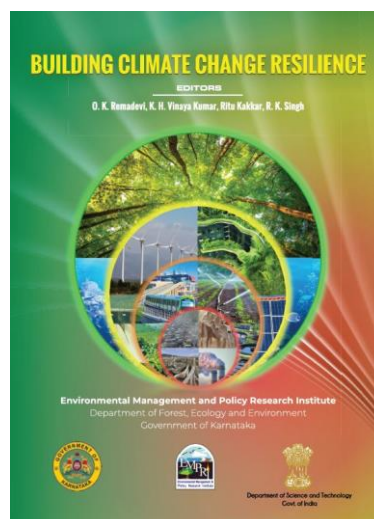
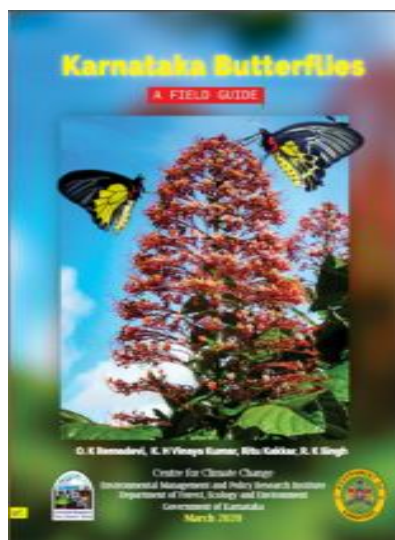
A project entitled, “Conservation and Management of Indigenous varieties of livestock (Cattle and Sheep) in the Wake of Climate Change in Karnataka” sanctioned in 2016 for Rs.24, 21,52,632/- by MoEF&CC, New Delhi is being undertaken by Karnataka livestock Development Agency (KLDA), Animal Husbandry and Veterinary Services (AH&VS). A total amount of Rs 496.60 lakh has been utilized by the implementing agencies. Currently, MoEF&CC has approved the request for component change on 31st December 2019 and one-year final extension till 15th August 2022 without any cost escalation. This extension of the project is subject to post-facto approval of the National Steering Committee (NSC) on Climate Change.

IV. Workshop/ Seminars/ Conference Conducted/Attended by Climate Change Researchers

- A two-day International Virtual Conference titled **Biodiversity and Ecosystem Services in a Climate Change Perspective**, is organized by EMPRI during Dec 10 and 11, 2020 sponsored by DST, GoI. There were five sessions with 64 papers presented in the conference. The key note speaker was Prof. Gadow, Germany and the chief guests were Dr. Akhilesh Gupta, Advisor and Head, SPLICE-DST and Prof. R. Sukumar, Centre for Ecological Sciences, IISc.
- **Online Courses attended by climate change staff**
 - Exploring Sustainability in the Indian Context (60 days)– Azim Premji University – Completed.
 - Post Graduate Certificate in Climate Change Programme (Two Years)– IGNOU – In Progress.
 - In House Training Programs – Soil Analysis, ISO/OHSAS/ NABL/NABET.

V. Research Publications

- Balasubramanian M, Manjunatha M, O K. Remadevi, K H VinayaKumar, RituKakkar and R K Singh (2019) Climate Change and Impacts of Vulnerable Communities: A Case study of Karnataka, **ISEC Monograph** 63:ISBN 81-7791-161-9.
- Kumar C.T.A., Remadevi O.K., Aminu-Taiwo B.R. (2020) Pest Management in Tropical Forests. 227-254. In: Chakravarthy A. (eds) **Innovative Pest Management Approaches for the 21st Century**. Springer, Singapore Springer Nature 1st ed. 2020, XXI, 519 pp.
- Vinayakumar, K.H., RituKakkar, O.K. Remadevi, B. Saritha, M. Manjunatha, Balasubramanya Sharma, Kiranraddi M, and Poorvashree. A baseline study on the floristic diversity of Permanent Preservation Plots, established in Bannerghatta National Park, Karnataka, **Building Climate Change Resilience**. ISBN: 978-93-89947-17-5, 54-60.
- O.K. Remadevi K.H. Vinaya Kumar, RituKakkar 2020. Butterfly monitoring programme for Karnataka, **Building Climate Change Resilience**, ISBN: 978-93-89947-17-5, 27-36.
- O.K. Remadevi, K.H. Vinaya Kumar, RituKakkar and R.K. Singh (Eds.) 2020 **Building Climate Change Resilience** is published in August 2020, ISBN: 978-93-89947-17-5. 296 pp.
- O.K. Remadevi, K.H. Vinaya Kumar, RituKakkar and R.K. Singh (Eds.) 2020. **Karnataka Butterflies – A field Guide** is published in June 2020, ISBN: 978-93-89947-18-8. 130pp.
- RituKakkar, K.H. Vinaya Kumar, O.K. Remadevi, Balasubramanya Sharma, M. Manjunatha, B. Saritha, Kiranraddi M., H.S. Dattaraja and H.S. Suresh. *Patterns Of Woody Species Diversity And Structure In Thalewood House Permanent Preservation Plot In Bannerghatta National Park, Bangalore, India*(Accepted in **Journal of Tropical Ecology**).
- S Manasi, N.Hema, ChannammaKambara, N. Latha, O.K. Remadevi and K.H.Vinaykumar 2020. Promoting green buildings towards achieving sustainable development goals: A Review – ISEC Working Paper 2020



2.2.3. Impact Assessment of Downhill Pipe Conveyor on Ambient Environment

I. Background Information

M/s. Jindal South West (JSW) Steel Ltd., Bellary, **Karnataka** got approval for operation of 3 'C' category mines through e-auction process carried out by the Government of Karnataka. To avoid disturbance to landscape, environment and wildlife of the project area as an environment friendly measure, JSW has planned transporting ore using Downhill Pipe Conveyors (DHPCs) from individual mines that joins the common Main Trunk Pipe Conveyor, connecting to Vijayanagara Steel Plant of JSW. In this transport mechanism, the ores are transported in **the conveyor** belt while transportation it became closed pipeline. The Three individual mining areas for transporting the mineral ores through DHPCs involve diversion of 5.271 ha, 0.64 ha and 15.981 ha forest lands in Sandur Taluk. JSW Steel Ltd., has obtained the Stage-1 Forest clearance from Ministry of Environment, Forests & Climate Change (MoEF&CC), by imposing certain stipulated conditions. Out of which one of the condition has been stipulated in the Stage-1 clearance stated that “The user agency shall conduct a study, at its cost, involving a reputed Institute on impact of downhill pipe conveyor on wildlife in the landscape and ambient environment”.

The Karnataka State Forest Department will decide the TOR for the study. The study may be conducted for a period of five years or as decided by the State Forest Department. Based on the above mentioned directions of the MoEF&CC. The Karnataka State Forest Department has drafted the Terms of References (ToRs) which are to be assessed and analyzed. As per the orders of MoEF&CC, a decision was taken by the State Forest Department to entrust the task of undertaking Impact Assessment of Downhill Pipe Conveyor on Ambient Environment of Bellary district to ‘Environmental Management and Policy Research Institute’ (EMPRI) for a period of 5 years.

II. Objective of the project

The key objective of the present study is to assess the impacts on the surrounding environment of the mine area caused due to the construction and operation of the DHPCs which pass through forest and non-forest areas. With the following TOR approved by State Forest Department the project have to carry out

- **Terms of Reference-1:** Inventorization of waterbodies within one kilometre radius in the corridor of DHPC line.
- **Terms of Reference-2:** Analysis of Surface Water and Groundwater Quality (Physico-chemical and Bacteriological Analysis).
- **Terms of Reference-3:** Monitoring Ambient Air Quality in the project area during construction and operation phases of DHPC (monitoring locations within the corridor of the three Downhill Pipe Conveyors i.e. from individual mines to common Main /Trunk Pipe Conveyor, connecting to Vijayanagara Steel Plant, Forest Area, Agricultural land, settlements, industries/ schools/ colleges/hospitals (sensitive zones).
- **Terms of Reference-4:** Monitoring Ambient Noise Levels at suitable intervals and locations in the project area (monitoring locations within the corridor of the three Downhill Pipe Conveyors i.e. from individual mines to common Main/Trunk Pipe Conveyor, connecting to Vijayanagara Steel Plant, Forest Area, Agricultural land, settlements, industries/schools/colleges/hospitals (sensitive zones).
- **Terms of Reference-5:** Analysis of Soil quality in the project area at suitable Locations (sampling locations within the corridor of the three Downhill Pipe Conveyors i.e. from

individual mines to common Main/Trunk Pipe Conveyor, Connecting to Vijayanagara Steel Plant, Forest Area, Agricultural land, Settlements, industries/schools/colleges/ hospitals (sensitive zones).

- **Terms of Reference-6:** Meteorological Monitoring in the project area (Temperature, Rainfall, wind, Direction, Relative Humidity and Wind Speed).
- **Terms of Reference-7:** Socio-economic survey (Assess the socio economic conditions of the people in the project influenced village).
- **Terms of Reference-8:** Land Use and Land Cover pattern analysis for the area will be done by using time series satellite imageries Later with reference to the assessed impacts, a mitigation measures to minimize the adverse impact on the ambient environment have to be suggested.

III. Progress (up to 31st March 2021)

1. Field Visits

Three field visits have been planned and executed. Two preliminary visits was made by two teams on January and March. The third visit was executed on April for identification of sampling points and to start sampling.

1.1. January (2021) visit to the site by the team and its findings

A preliminary visit was initiated by EMPRI where JSW presented about their mining and ore transportation activities. Site visit was proceeded for two days, where the mining regions, DHPC, its construction area, transfer points and main conveyor pipes was observed. Our study includes three Downhill pipeline conveyor transferring ores from three mines named;

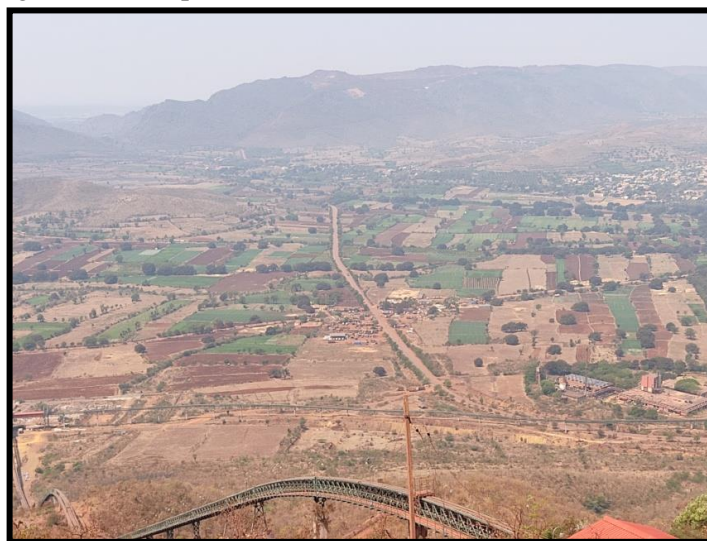
1. M/S/. Devadari mine
2. M/S/. Tunga & Bhadra mines
3. M/S/. Rama mines



Tunga & Badra DHPC

The fine ores produced in these mines get transferred to the main pipe conveyor which reaches the JSW steel plant. Usually these ores are transported by means of trucks which are partially updated to DHPC now. These DHPC passes through forest and non-forest lands. All three DHPC meet the conveyor pipes at different points of different locations.

1. Nandihalli Transfer point (from Devadhari mine)
2. Bannihatti Transfer point (from Tunga& Bhadra mines)
3. Bhujanganagara Transfer point (from Rama mine)



View point from Devdhari mines

1.2. March (2021) visit to the site by the team and its findings

After the preliminary visits, observation of the villages around the study area was made. The villages in the study area, its water bodies, number of sensitive areas like schools, hospitals, agriculture areas such as field data was observed and collected

Additionally, many government departments like;

- Karnataka State Pollution Control Board, Bellari
- Karnataka Forest Department
- Department Of Mines and Geology, Hospet
- Tahsildhar Office, Sandur
- Surveyor Office, Sandur
- Agriculture Office, Sandur
- Forest Office, Sandur Taluk.

In these visit team EMPRI had discussed about the project to respective officers and requested to share data as required. An official letter was also send to respective departments.

1.3. Results of initial visits

As the results of the initial site visit the team is aware of

- The locations of the mines
- The progress of all three DHPC
- It is notable that the Particulate matter deposition is higher in the entire region and its vegetation.
- A major reservoir Narihalli is observed nearby
- Agricultural lands are observed nearby with few vegetation like onions
- Quite large amount of noise is produced when the belt is open

- Few villages near to the mining area are observed

IV. Advisory Committee

The following 7 Government Departments have been approached for advisory Committee

- KSPCB, Bangalore
- KSPCB, Ballari
- DCF, Ballari division
- CCF, Ballari
- Geology and mines department, Ballari,
- Agricultural department, Ballari
- Horticultural department, Ballari

V. Procurement of Instruments

Certain instruments are required for Monitoring ambient air quality and noise, collecting soil and water samples for analysis, weather monitoring and so on. To proceed with the project these instruments and equipment's along with Personal protection kits need to be procured.

An instrument file had put up with all the instruments and equipment data including the model, specification, approximate price, available platform with its individual product ID. The file is approved and ready to be procured.

VI. Socio-Economic Form

Socio-Economic survey is a part of the Terms of Reference drafted by Karnataka Forest Department. Questionnaires were created for survey.

VII. Data Collected

Data collection have been focused from the beginning of the project and various data are collected from various departments and from field observations.

Sl. No.	Document details
1.	Pipe Conveyors – Technical Details
2.	Listed details of the locations visited and villages covered during 27 th and 28 th
3.	Bhadra Mines EC May-20
4.	Bhadra Mines EIA-EMP 2019
5.	Bhadra Mines FC Stage-1 2018
6.	Bhadra Mines FC Stage-2
7.	Devadari DHPC FC Stage -1 2018
8.	Nandi Mines EIA – EMP 2017 June
9.	Old EC Rama Dec-09
10.	Rama DHPC FC Stage – 1 2018
11.	Rama Mine EC Transfer 2019
12.	Rama Mine EIA-EMP 2019
13.	Rama Mine FC Stage 2 2019

Sl. No.	Document details
14.	Tunga Bhadra DHPC FC Stage - 1 Dec-18
15.	Bhadra Mine – Key Plan and Socioeconomic Details
16.	Rama Mine – Key Plan and Socioeconomic Details
17.	Devadari Mine - Key Plan and Socio economic Details and Details of Nandi Mine (the buffer zone is common for both Nandi and Devdari Mines)
18.	Length of forest and non-forest area of DHPCs for all three mines
19.	Socio economic survey of all three mines
20.	Forest application form (FC)
21.	KML files of all three mines
22.	2009-2018 Matereological data
23.	EMP reports of Devdhari iron mine
24.	EMP reports of Devdhari iron mine 2020
25.	EMP reports of Devdhari iron mine 2021
26.	EMP reports of Rama and Nandi mines
27.	EMP reports of Rama and N andi mines 2020
28.	EMP reports of Bhadra iron mines 2021
29.	Village Census 2011
30.	Soil Moisture content conservation Plan Devadhari 2018
31.	ICRISAT watershed management Bellari
32.	Crop production and agriculture report 2010-11

VIII. Budget: total sanctioned amount (inr. 89.98 lakhs) for one year (january 2021-january 2022).budget allotted for first year 2021 (70% of the total sanctioned amount). (inr62.98 lakhs).

2.2.4. Impact of Air Pollution of Bengaluru Metropolitan Transportation Corporation (BMTC) Crew

Impact of air pollution on BMTC crew is a project funded by the Centre for infrastructure, Sustainable Transportation and Urban Planning (CiSTUP). Bangalore Metropolitan Transport Corporation (BMTC) bus crew is on the road in open air for more than 8 hr/day (sometimes up to 12 hours), and therefore, are exposed to much higher levels of air pollutants than an individual resting at home or working at an office. Therefore, BMTC crew members' health is severely affected. Exposure study under real world conditions and determine the pollutant concentration inhaled by an average BMTC crew member under normal working conditions will help in developing solution to protect the health of BMTC crew from the effects of air pollutants. Project team has done Preliminary Survey by visiting 48 bus depots of BMTC and shortlisted the suitable depots for monitoring of Air pollution.

2.3. Quality Assurance Cell (QAC)

QAC at EMPRI was established as a requirement to measure and monitor Quality, Operational Health and Safety Management System (OH&SMS) objectives as per the requirements of ISO standards and other legal regulatory and statutory requirement. This was formed under the scope and discussion of 60th Executive Committee (EC) meeting dated: 21.12.2020. The activities of QAC include:

- Establish, Implement and Maintain IMS manual, procedures, Standard Operating Procedures (SOPs), Master's including forms and registers
- Plan and prepare for Audit of IMS (QMS and OH&SMS)
- Follow up with compliance arising from audit and mitigate with corrective actions

The Institute was earlier approved by M/s Intertek as an ISO 9001:2015 and OHSAS 18001:2007 organization. However the certificate got expired in January 2021 after which the organization is under process of Recertification and has completed stage-1 audit.

2.4. Laboratories

1. National Accreditation Board for Testing and Calibration Laboratories (NABL)

EMPRI labs were inaugurated in 2016 and ever since then lab is growing with addition of many analysis equipments/instruments. Water and Microbiology laboratories are well equipped to carry analysis of Water, Wastewater, Soil, Sediment & Air samples for various Physico-chemical and biological parameters. Labs have been accredited for ISO 9001:2015 & OHSAS 18001:2007 during January 2018. In March 2021 EMPRI Laboratory has awarded for NABL accreditation to Physico-Chemical (18 Parameters) for Water and Waste water.

2. The Environment (Protection) Act, 1986

EMPRI Laboratory has completed the process for accreditation of The Environment (Protection) Act, 1986, on February 2021 EMPRI has received letter from Central Pollution Control Board stating that recognition for Environment (Protection) Act, 1986 to EMPRI has been approved in Board meeting. The name of the laboratory is under process for its notification in Govt. of India Gazette, waiting for notification in Govt. of India Gazette

3. National Accreditation Board for Education and Training (NABET)

EMPRI is under the process of obtaining accreditation from National Accreditation Board for Education and Training (NABET) as an EIA consultant organisation for undertaking Environmental Impact Assessment studies and the application filing is under the process.

4. Water Analysis Laboratory

The capacity for handling number of samples and parameters that can be analysed in the laboratories have been increased with time from 18 parameters(in 2016) to 47 parameters (by end of January 2021) with the procurement of new equipments which are listed. The list of parameters that are newly added the existing are presented table. This increased capacity of laboratories with installation of new instruments/equipments has resulted in increased number of samples being received from the community and other governing bodies.

a) **List of New Equipments/Instruments that has been installed during the Financial Year 2020-21**

Sl. No	Equipment/Instrument Name
1	Double Distillation unit
2	Respirable Dust Samplers(Noise less Blower)
3	Flue Gas analyser
4	Handy sampler (5 No)
5	Rotary Evaporator
6	Soil Sampler (Agar)
7	Class E2 Standard weight box
8	Turbidity meter

b) **List of Newly Added Parameters Analysed in the Water Laboratory from Year 2020-21**

Sl. No	Newly Added Parameters
1	Phyto planktons
2	Zoo planktons
3	Gaseous samples using Handy Sampler
4	4 Metals (Ni,Pb,Cr&Cd)

Laboratories are extensively being used for analysis of both in-house and external samples. The details of different samples that have been received and analysed in the laboratories during the Year 2020-21 is as presented in Table. Apart from samples submitted by external clients. The various projects from which the samples of house have been received and analysed are as listed below.

- 1) Documentation of Yettinahole project site and assessment of cumulative impact of multiple projects in afforested land scape.
- 2) The study of Environment Carrying Capacity of Udupi Taluk.
- 3) Estimation of Photosynthetic Potential of Dominant Mangroves species in different Osmotic Environment.

c) **Below Provides the Details of Various Samples Analysed During the Financial Year 2020-21.**

Sl. No	Type of Samples	No of Samples Analysed
1	Water samples	158
2	Microbiology samples	62
3	Soil and Sediments	34
4	Ambient Air	786

2.5. Outreach Activities

2.5.1. Environmental Information System (ENVIS) Centre

The Environmental Information System (ENVIS) of Karnataka with the subject area “State of Environment and Related issues” is operating in Karnataka since Deember 2002. It was established as ENVIS centre on 1st January 2009 at EMRPI, Bengaluru. The ENVIS scheme was revamped in April, 2017 with addition of new initiatives to the previously existing one. The ENVIS centre Karnataka carried out the activities in the following areas. The details are as below:

a) ENVIS Website

The ENVIS centre Karnataka has a dedicated website on the National Informatics Centre (NIC) Content Management System (CMS) portal - www.karenvis.nic.in. The contents of the website is published and managed by the ENVIS centre Karnataka as per the guidelines given by Ministry of Environment Forest & Climate Change (MoEF&CC). Recently, the website was redesigned to make information more accessible with more attractive features.



b) Indian State Level Basic Environmental Information Database (ISBEID)

The Indian State-Level Basic Environmental Information Database (ISBEID) is an ambitious programme of the Ministry of Environment and Forests, Government of India (GoI) in order to make environmental status easily available to researchers, students, policy makers, and the general public at large. The data have been classified into 17 modules/sectors. Data for all these sectors have been collected either in full or in partial (year wise). For all the 17 modules and sub-modules data has been collected & uploaded on an average of 10-12 years or more. Number of entries done: **19,128**(April 2020 to March 2021)

State	Year	Module	Value	Unit	Source
KARNATAKA	2019	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2018	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2017	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2016	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2015	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2014	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2013	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2012	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2011	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2010	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2009	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2008	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2007	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2006	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2005	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2004	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2003	ENVIS	19128		ENVIS Centre Karnataka
KARNATAKA	2002	ENVIS	19128		ENVIS Centre Karnataka

c) ENVIS Newsletter ‘PARISARA’

ENVIS centre has been publishing a quarterly newsletter ‘PARISARA’. Centre has published 59 issues till March 2021. Newsletters published in the FY: 2020-21 are as follows:

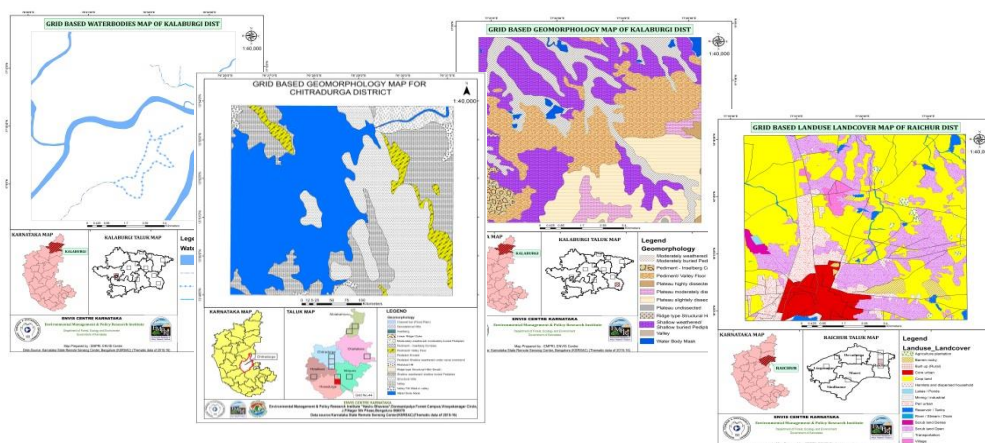
- Issue 56 on **Ecosystem Services of Biodiversity**,
- Issue 57 on **Corona Virus**,
- Issue 58 on **Landfills of Karnataka** and
- Issue 59 on **Fruit Biodiversity of Karnataka**.

Available for download on WWW.KARENVIS.NIC.IN



d) National Environment Survey (NES) - Grid Based Resource Information Decision Support System (GRIDSS)

EMPRI-ENVIS was entrusted to carry out National Environment Survey (NES) - a Gridbased Resource Information and Decision Support System (GRIDSS) program for 14 districts of Karnataka viz., Ramnagar, Bengaluru rural, Bengaluru urban, Bidar, Chitadurga, Davangere, Tumkur, Chikkaballapura, Kolar, Raichur, Ballari, Kalaburagi, Koppal and Yadgir. The study is performed through different parameters such as water, soil, forest & wildlife, flora & fauna, wetlands, lakes, rivers, LU/LC, Mining & water bodies etc. and mapped into 9 X 9km grids. Till date mapping for 13 districts have been completed out of 14 assigned districts of Karnataka.



The number of thematic map prepared for each district is given below;

- Ramnagara 865 maps prepared for entire district covering 63 grids under 19 themes
- Bengaluru Rural 468 maps prepared for entire district covering 52 grids under 9 themes
- Bengaluru Urban - 110 maps prepared for 10 selected grids under 11 themes
- Chikkaballapura - 110 maps prepared for 10 selected grids under 11 themes
- Tumkur- 110 maps prepared for 10 selected grids under 11 themes
- Kolar- 110 maps prepared for 10 selected grids under 11 themes
- Davangere- 110 maps prepared for 10 selected grids under 11 themes
- Chitradurga- 110 maps prepared for 10 selected grids under 11 themes
- Bidar- 110 maps prepared for 10 selected grids under 11 themes
- Raichur- 100 maps prepared for 10 selected grids under 11 themes
- Yadgir- 100 maps prepared for 10 selected grids under 10 themes
- Kalaburagi - 100 maps prepared for 10 selected grids under 10 themes
- Koppal- 110 maps prepared for 10 selected grids under 11 themes

e) EMPRI Library

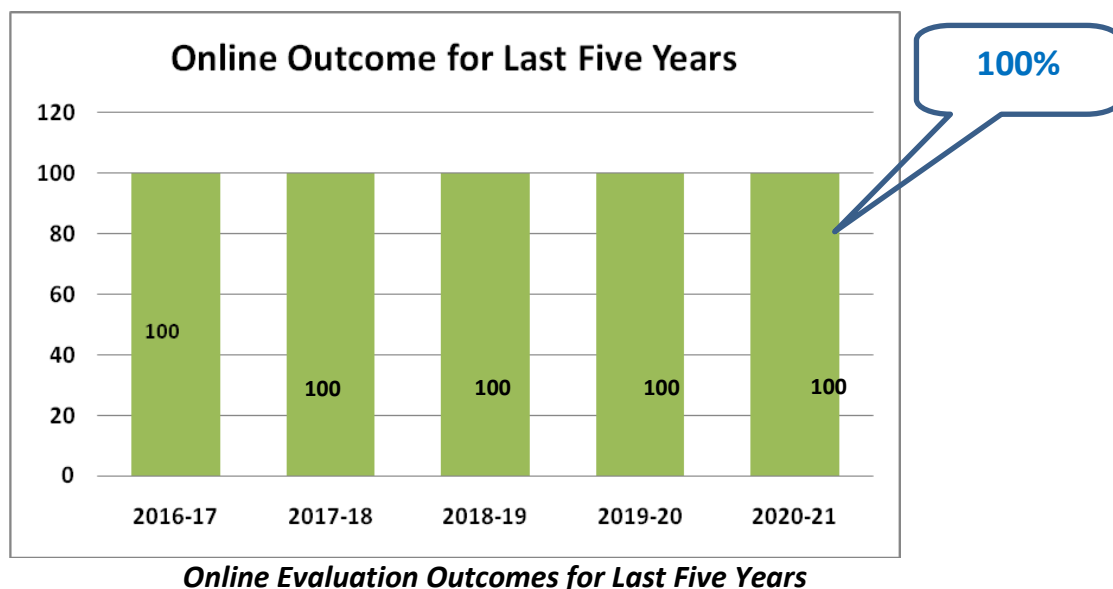
The library is a documented repository of information and it has a collection of over 3500 books. The library also receives more than 27 state/national journals and newsletters covering diverse areas of environment.

Library resources

- There are more than 3500 books including text books , Reports , Success stories ,Journals and project reports

- EMPRI Library has more than **170** CD-ROM
- Databases; 04 Newspapers (1 Kannada, 3 English) subscriptions and Toposheets maps- **650**.
- More than 60 Newsletters and published books (Empri and other concerned organisations)
- Subscription to the “The Indian Forester” Journal (TIFJ) and archival CD-ROM database (from **1875**)
- EMPRI library has been using the **KOHA** open source software (OSS) for Library automation. The Library has automated **3500** books which includes reference books, text books, reports etc.,

Karnataka State ENVIS Online Performance Report



f) Green Skill Development Programme(GSDP) Courses

- Green Skill Development Programme (GSDP) Certificate Course on Preparation of People Biodiversity Register (PBR) organised by EMPRI to the students who are graduate in science for period of one month from 22nd February to 25th March 2021. The duration of this course is 200hrs.
- **Outcome:** GSDP Trainees who participated in the programme are well versed with the knowledge gained in the course and also these candidates got placed in various Research Institutions, NGO’s and Private organizations. Two of the PBR candidates got placed in autonomous institute and private organisation. Few of the candidates are willing to take up preparation PBR reports at their home town with the support of State Biodiversity Board, and few others are interested to take up higher studies and competitive examinations.

g) Other Activities conducted by ENVIS Centre along with Host Institution EMPRI

1. **Awareness on Beach Safety Measures:** EMPRI ENVIS along with National Green Corps conducted an Online Webinar as a part of Environment Educational Event for Padubidri Beach and Kasarkod Beach with duration of 1 hr on 20th may 2020. The theme of event was on “Awareness on Beach Safety Measures” with expert panel discussion which included Dr K. H. Vinay Kumar, Director Research ,EMPRI , Mr Sanjai Jalla , Expert on Beach safety, MOEF&CC , Mr Ramesha D Nayal Senior environmental officer KSPCB, Dr Laksmikanth, Regional officer, KSPCB, Karwar, Mr Vijay Hegde, Regional Officer, Udupi.

2. **Facebook Photo Contest:** EMPRI ENVIS conducted an Online Facebook Photo Contest on the occasion of World Environment Day 2020 with the theme “Biodiversity of Birds” in the month of May and June 2020. Around 76 participants presented their photographs for the competition. 3 cash prizes were awarded for the best photographs and all participants received participation certificates. EMPRI ENVIS along with National Green Corps organised an online photo competition on **Biodiversity of Moths** to celebrate National Moth week 18-26 July 2020. Around 200 photos varying 51 species were received as a part of this competition and 7 cash prizes were awarded for the best photographs.
3. **Plantation Drive 2020:** ENVIS Hub, BANGALORE, along with EMPRI organized Plantation Drive on **World Environment Day** 2020 on 04.06.2020 at Doresanipalya forest Campus more than 50 saplings of rare plant species were planted during the drive. Shri. Raj Kishore Singh IFS., Director General, EMPRI, Dr. K. H. Vinayakumar, IFS. CCF, Director (Research), EMPRI, Shri Ramesha C, Project Development Officer, EMPRI along with EMPRI Staff participated in the plantation drive and successfully planted the saplings.
4. **“Terrace Gardening” Workshop:** To introduce greenery and enhance the beauty of workspaces and homes, ENVIS Hub Bangalore organized **“Terrace Gardening”** one day Workshop at EMPRI on 27.06.2020. Shri. Vishwanatha P D, Asst. Horticulture Officer has been invited to share the importance and implementation of terrace gardening methods. Shri. Raj Kishore Singh., IFS., Director General, EMPRI, Dr. K. H. Vinaya Kumar, IFS., Director & Director (Research), EMPRI, Shri Ramesha C, Project Development Officer, Smt. Nousheen Jabeen, Gazetted Manager, EMPRI and Smt. O.K. Remadevi, Consultant, EMPRI as well as all EMPRI Staff were actively participated in the programme. Around 50 pots with flowering plants were planted in EMPRI terrace.
5. **Book Release:** ENVIS Released publications on **“Spiders of Karnataka”** -a brochures including 110 species and **“Wetland Birds of Bengaluru”**-Hand guide with 55 species and Environment related poetry book- **“Nisargadatta Enna Chithha”** on 29.06.2020. The book release function was chaired by Shri. R.M.N Sahai, IFS(retd) & Ex-Director General, EMPRI (Chairperson), Dr. Sudha Rao, Ex-Vice Chancellor of Karnataka State Open University (KSOU), Shri. Raj Kishore Singh, IFS. Director General, EMPRI and Dr. K.H. Vinaya Kumar, IFS., Director (Research), EMPRI.
6. **International Virtual Conference on Environmental Impact Assessment (IVC-EIA 2020):** The centre conducted virtual conference on 1st December 2020 with the topic **“Environmental Impact Assessment”**. The Conference was programed with key note addresses, invited talks, technical sessions with paper and poster presentation followed by panel discussions to cover various aspects of Environmental Impact Assessment under the following themes. 1. Scope of EIA and way forward, 2. Projects for which EIA is mandatory, 3. EIA Notifications and Regulations 4. Process and Types of EIA. Smt. Saswati Mishra IFS. Chief Conservator of Forest (CCF), Special Director, Technical Cell, FEE, and Govt. of Karnataka & Shri. Vijaya Kumar Gogi, Principle Secretary, Ecology and Environment, Govt of Karnataka and Chairman Karnataka state pollution control board (KSPCB) were the chief guests of this program. Around 59 people participated in the conference. Total of 10 oral and 3 posters were presented in the conference and cash awards for 2 best oral presentations and 3 best poster presentations were distributed.

7. **World Water day Celebration:** EMPRI ENVIS along with National Green Corps and Centre for Capacity Building conducted a Knowledge enhancement program on World Water Day with the theme “**Valuing Water**” at EMPRI conference hall on 22 March 2021. Shri T. Mahesh Director (Technical), EMPRI and Dr K.H Vinay Kumar. EMPRI fellow Environment & Director (Research) (I/C), EMPRI were addressed the program. EMPRI staff along with the PBR and STP training participants actively participated in this program.

h) The centre has created knowledge products and the data bases

➤ Database updated on Karenvis Website

- State-wise Number of Villages Electrified
- Source wise and State wise Estimated Potential of Renewable Power in India
- Region wise and State-wise Installed Generating Capacity of Electricity
- State-wise cumulative installed capacity of Grid Interactive Renewable Power
- State-Wise Installation of Off-grid / Decentralised Renewable Energy Systems/ Devices

➤ Posters / leaflets prepared

- | | |
|---|------------------------------------|
| • World Rivers Day 2020 | • International Tiger Day 2020 |
| • World Nature Conservation Day 2020 | • World Lion Day |
| • World Earth Day 2020 | • World Elephant Day |
| • COVID Do's & Don'ts | • World Ozone Day |
| • World Environment Day 2020 | • World Habitat Day |
| • A Webinar on Web based Awareness on Beach Safety Measures | • Wild Life Week |
| • Maintain Safe Social Distance | • World Soil Day |
| • Critically Endangered Mammals | • International Mountain Day |
| • World Ocean Day | • National Energy Conservation Day |
| • Change in Life After Covid 19 | • National Farmer's Day |
| • National Moth Week | • World Sparrow Day |
| • Mangroves and its Ecosystem Services | • National Science Day |
| | • World Wetland Day |

2.5.2. National Green Corps (NGC)

National Green Corps (NGC) is a national school programme launched in 2001 by the Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India (GoI). The main objective of the scheme is to establish “National Green Army” by creating eco-clubs in schools all over the state to spread awareness on environment and carry out action based programmes for protection and improvement of environment. Environmental Management and Policy Research Institute (EMPRI) are serving as Nodal Agency for NGC in Karnataka to implement the programme since January 2009. As per the guidelines of MoEF&CC, 16850 eco-clubs have been established in 34 educational districts of Karnataka State for the financial year 2020-21. The details of eco-clubs are as follows:-

Number of Eco-club Schools in Karnataka state under NGC Programme

SL No	Category of Schools	No. of Eco-club schools
1	Government Higher Primary Schools	8203
2	Government High Schools	4737
3	Government Aided Higher Primary Schools	813
4	Government Aided High Schools	2832
5	Private (Unaided) Schools	265
Total		16850

A. NGC Programme during 2020-21

For the financial year 2020-21, In order to support the activities of EEAT Scheme in the State of Karnataka, under Environment Education Awareness and Training (EEAT) Scheme vide MoEF&CC (Environment Education) EE-Division sanction order No.3-140/2001- EE(Vol.1) dated 15th June 2020, MoEF&CC had sanctioned Grants- in-Aid of total Rs 9,44,35,000/- (Rupees nine crore forty four lakh thirty five thousand only) to EMPRI. Sanctioned grant in aid included financial assistance of Rs 8,50,00,000 (Rupees eight crore fifty lakh only) to 17000 ecoclubs, financial assistance of Rs 8,50,000/- (Rupees eight lakh fifty thousand only) to 34 educational districts and Rs 85,85,000/- (Rupees eighty five lakh eighty five thousand only) administrative charges for 2020-21.

For the financial year 2020-21, MOEF&CC had released total amount of Rs 9,29,99,112/- (Nine crore twenty nine lakh ninety nine thousand one hundred twelve only) to EMPRI. Released amount included financial assistance of Rs.8,50,00,000/- (Rupees eight crore and fifty lakh only) to 17000 ecoclubs @ Rs 5,000/- per Eco-club and financial assistance of Rs 8,50,000/- (Rupees eight lakh fifty thousand only) to 34 educational districts @Rs.25,000/- per educational districts for strengthening, monitoring and implementation of NGC Programme and reimbursement of administrative charges of Rs 71,49,112/- (Seventy one lakh forty nine thousand one hundred twelve only) for financial year 2019-20.

**District wise fund release details of NGC Schools and Samagra Shikshana,
Karnataka (SSK) of 34 educational districts**

Sl. no	District Name	Total No. of Eco-club Schools	Grants-in Aid to Eco- club schools (Rs.)	Financial assistance to SSK of Districts (Rs.)
1	Bagalkote	500	25,00,000	25,000
2	Bengaluru North	499	24,95,000	25,000
3	Bengaluru Rural	500	25,00,000	25,000
4	Bengaluru South	500	25,00,000	25,000
5	Belgaum	500	25,00,000	25,000
6	Bellary	500	25,00,000	25,000
7	Bidar	500	25,00,000	25,000
8	Bijapur	500	25,00,000	25,000
9	Chikkaballapura	500	25,00,000	25,000
10	Chamarajanagara	500	25,00,000	25,000

Sl. no	District Name	Total No. of Eco-club Schools	Grants-in Aid to Eco-club schools (Rs.)	Financial assistance to SSK of Districts (Rs.)
11	Chikkodi	500	25,00,000	25,000
12	Chikamagaluru	500	25,00,000	25,000
13	Chitradurga	500	25,00,000	25,000
14	Dakshina Kannada	500	25,00,000	25,000
15	Davangere	500	25,00,000	25,000
16	Dharwad	500	25,00,000	25,000
17	Gadag	500	25,00,000	25,000
18	Gulbarga	500	25,00,000	25,000
19	Hassan	500	25,00,000	25,000
20	Haveri	500	25,00,000	25,000
21	Kodagu	360	18,00,000	25,000
22	Kolar	500	25,00,000	25,000
23	Koppal	500	25,00,000	25,000
24	Madhugiri	500	25,00,000	25,000
25	Mandya	500	25,00,000	25,000
26	Mysore	499	24,95,000	25,000
27	Raichur	492	24,60,000	25,000
28	Ramanagara	500	25,00,000	25,000
29	Shimoga	500	25,00,000	25,000
30	Sirsi	500	25,00,000	25,000
31	Tumkur	500	25,00,000	25,000
32	Udupi	500	25,00,000	25,000
33	Uttara Kannada	500	25,00,000	25,000
34	Yadgir	500	25,00,000	25,000
	Total	16850	8,42,50,000	8,50,000

B. Details of the Programmes/Activities for the year - 2020-21

Sl. No.	Programme Details	Total Number of Programmes/Activities
1	Environmental Days Celebrations	5
2	Important day celebrations	2
3	Activities under Swachhta Action Plan (SAP)	20
4	Cleaning & Awareness activities at coastal beaches	5 beaches
5	Awareness programmes	10
6	Training programmes	86
7	Meetings	17
8	Other initiatives	1
9	Achievements	2
10	School visit	1668

1. Environmental Days Celebrations

S.L No.	Name of Campaign /Program	Dates of the campaign	Location	Target group	No of Participants	Summary
1	World Earth day	22/04/2020	Online	Students	100+	Online drawing and poem competitions were conducted for the school children.
2	World Environment Day Celebration	05/06/2020	EMPRI, J P Nagar, Bangalore	EMPRI staff	100+	Plantation drive was conducted at EMPRI, Doresanipalya forest campus on the occasion of World Environment Day. Different fruit species were planted.
3	World Ozone Day Celebration	16/09/2020	Online	Students, teachers and general public.	250+	Online webinar by Smt Lakshmi Balaji, was organized on the theme “Ozone for life: 35 years of ozone layer protection”.
4	World Wet Land Day Celebration	02/02/2021	Government Higher primary School, Rojipura, Doddaballapura Bangalore Rural District	Eco-club Teachers and Students	200+	<ul style="list-style-type: none"> • Quiz and Essay writing competitions were conducted on importance of Wet Land Day for students. • Distributed T-Shirts, Caps and refreshments to the students. • Distributed prizes to the winners of competitions
5	World Water Day Celebration	22/03/2021	EMPRI, J P Nagar, Bangalore	EMPRI Staff, Trainees of Green Skill Development Programme (GSDP) training & college students	100+	A Workshop was organised on the occasion of World water day. Dr K H Vinay Kumar, Director (research) and Mahesh T, Technical Director, delivered lectures on the “ Importance of water”

2. Important Days Celebrations

S.L No.	Name of Campaign /Program	Dates of the campaign	Location	Target group	No of Participants	Summary
1	Constitution day	26-11-2020	EMPRI Project Office, Malleshwaram & eco-club schools across Karnataka	EMPRI Staff, teachers and Eco-club students	100+	<ul style="list-style-type: none"> • Staff of EMPRI read out Constitution Preamble • Conducted drawing, essay writing competitions on Human rights and Fundamental rights at Eco-club schools • Constitution preamble read by students at their residence due to COVID-19
2	International Women's day celebration	08.03.2021	1)Malleshwaram Ladies Association High School Malleshwaram Bangalore 2)Maharani Lakshmi Ammani College Malleshwaram Bangalore	Teachers and students of Malleshwaram Ladies Association High school Technical and Non-technical staffs and students of Maharani Lakshmi Ammani College	100+	<ul style="list-style-type: none"> • Conducted Speech competitions for students on "Challenges faced by women" and distributed prizes to the winners. • Distributed T-shirts, caps and labels with environment messages to the students and staffs. • Distributed eco-friendly Dustbins to Malleshwaram Ladies Association High school and Maharani Lakshmi Ammani College.

3. Activities under Swachhta Action Plan (SAP)

Sl. No	Name of Campaign/Program	Dates of the campaign	Location	Target group	No of Participants	Summary
01	Dust to dustbin campaign	June 10th to June 25th	Malleswaram, Majestic, KR Market, Yeshwanthpura market, Lalbagh Botanical Garden, Bengaluru City	Public	100+	NGC team campaigned in different parts of Bengaluru to create awareness on solid waste management rules among the people. Flyers with the information of solid waste management rules – 2016 were distributed to government offices, playgrounds, bus stops, auto stands, street side stalls and to the public.
02	Distribution of masks and sanitizers	13.07.2020	Malleswaram	Public	100+	Sanitizers and masks were distributed to the underprivileged people in order to create awareness on COVID-19 pandemic.
03	Display of Swachatha Messages	14.07.2020	NGC Website & Ecoclub schools.	Public	1000+	Displayed message of swachh bharath, A step towards cleanliness and “swachh meva jayathe” messages at National Green Corps Karnataka website, https://ngc.karnataka.gov.in/ . Ecoclub schools displayed messages on cleanliness by organizing different activities and programmes.
04	Online Photo competition on biodiversity of moths	18.07.2020 to 01.08.2020	EMPRI	Public	80+	NGC section in association with Environmental Information System (ENVIS) section organized a Photo competition on biodiversity of moths to create awareness on bio diversity.
05	Distribution of Hand washes	23.07.2020	Malleswaram	Public	100+	Hand washes were distributed to the under privileged people in order to create awareness on COVID-19 pandemic.
06	Online Competition for school children	05.08.2020	EMPRI	School children	276+	Organized online competition such as Slogan writing competition with the theme swach bharath for higher primary students and drawing competition with the theme

Sl. No	Name of Campaign/Program	Dates of the campaign	Location	Target group	No of Participants	Summary
						COVID –19 awareness for high school students. Distributed prizes to the winners.
07	Display of Swachatha Messages in office	08.08.2020	EMPRI, JP Nagar and project office, Malleshwaram	Public	10000+	Messages on plastic ban and alternatives to single use plastic are displayed in front office to create awareness on harmful effects of plastic and its alternative.
08	Cleanliness and Plantation drive	03.11.2020 to 10.11.2020	EMPRI Project office, Maragosa road, Malleshwarm, Bangalore.	EMPRI Staff and public	200+	<ul style="list-style-type: none"> To promote Poshan Abhiyan programme, Cleanliness and Plantation drive was organized at EMPRI Project office Maragosa road, Malleshwarm, Bangalore to create awareness among public and Eco-club school children. Planted more than 50+ medicinal plants, 30+ Ornamental plants and 30+vegetable plants (kitchen garden plants).
09	Harit Diwali-Swasth Diwali	13.11.2020	Maharani Lakshmi Ammani College Malleshwarm	Technical and Non-technical staffs and students of Maharani Lakshmi Ammani College	50+	Harit Diwali-Swasth Diwali campaign was organised at Maharani Lakshmi Ammani(MLA) College, Malleshwarm to create awareness on Crackers free Diwali for the protection of environment.
10	Circulation of Kannada version of E-Waste Management rules-2016 manual	19-11-2020	Through E-mail	Government officers, public, Education department, Forest, Environment and Ecology department,etc.	500+	E-waste management rules 2016 was translated to kannada language and soft copy of the same was sent to different departments to create awareness on E waste.
11	Webinar on E-Waste Management	21-11-2020	Online	Education department officers, Head masters/mistress, Eco-club incharge teachers ,students and public	130+	Resource person, Rohini Gopal, Programme Manager, International Institute of Waste Management delivered a lecture on E-waste Management.

Sl. No	Name of Campaign/Program	Dates of the campaign	Location	Target group	No of Participants	Summary
12	ODF Awareness	25.11.2020	Poojenahally, Sadhahally, - Devanahally Rural areas, Bangalore Rural areas and Doddaballapura	Public, teachers and students	500+	ODF awareness campaign was conducted in different parts of Bangalore. Flyers were printed with the information on Open defecation free message.
13	Webinar on Solid-Waste Management	25-11-2020	Online	Education department officers, Head master/mistress, Eco-club incharge teachers, students and public.	250+	Resource Person Lakshmi Balaji, Associate Teacher, Sri Vani Education Society, Bangalore, delivered a lecture on solid-waste Management.
14	Webinar on Plastic-Ban Awareness	24-12-2020	Online	Eco club incharge teachers and students	250+	<ul style="list-style-type: none"> Resource person Rajshekar patil, Co-ordinator, Karnataka Rajya Vijnana Parishat, Belagavi, delivered a lecture on Plastic-ban Awareness.
15	Plastic-Ban Awareness	26-12-2020	Malleswaram and surrounding areas	Public	500+	<ul style="list-style-type: none"> Plastic Ban Awareness campaign was conducted in different parts of Bangalore by NGC team Flyers were printed with the message of banned single use plastic materials and its alternative and distributed to the public.
16	Antilitter campaign and Covid-19 Awareness program	07.01.2021	Government Boys High School, Malleshwaram	Eco-club Teachers and Students	200+	<ul style="list-style-type: none"> Eco-Quiz and Essay writing competitions were conducted to the students. Distributed labels, drawing books, stationary items and refreshments to the students.
17	Activities promoted through social media	01.04.2020 to 31.03.2021	Website, Facebook and twitter account of NGC	Public	1000+	NGC and Swachta Action plan Activities were displayed in social media of NGC. Facebookpage: https://www.facebook.com/NGCkarnataka/ Twitter page https://twitter.com/NGCkarnataka201

Sl. No	Name of Campaign/Program	Dates of the campaign	Location	Target group	No of Participants	Summary
						Website https://ngc.karnataka.gov.in/
18	White board animations	During FY 2020-21	Digital media	Public, Ecoclub incharge teachers and students	-	White board animations on Air pollution, Plastic pollution, Solid waste management and biomedical waste management were prepared to circulate among public through digital media to create awareness on different environmental issues and problems.
19	A Documentary video “Hakkigonda Gudukodi”	During FY 2020-21	Digital media	Public, Ecoclub incharge teachers and students	-	Documentary video on “Hakkigonda Gudukodi” was prepared to circulate among public through digital media. Video was prepared based on the children book authored by Na D’Souza, A well-known novelist and writer in Kannada language.
20	A Book “Paschima Gattagalu mathu hava mana badalavane”.	During FY 2020-21	Digital media	Public, Ecoclub incharge teachers and students	-	A book by name “Paschima Gattagalu mathu hava mana badalavane” was authored by Na D’Souza, A well-known novelist and writer in Kannada language. This book focuses on impact of climate change on western Ghats and its implications.

4. Cleaning & Awareness Activities at Coastal Beaches

Sl. No	Name of Campaign / Program	Dates of the campaign	Location	Target group	No of Participants	Summary
01	Adoption of 5 coastal beaches for cleanliness & awareness programmes under Swachta Action Plan	10/11/2020 to 31/03/2021	Bengre beach, Iddya beach, Suratkal beach of Dakshina kannada district, Kodi beach & Mkodi beach of Udupi district and Gokarna beach of Uttara kannada district	Public, Beach visitors and tourists	10000+	<ul style="list-style-type: none"> • EMPRI in association with department of forest, ecology and environment initiated cleanliness and awareness programme and beach cleaning by adopting five beaches in 3 districts of coastal Karnataka. The programme was initiated in November 2020 and continued up to March 2021. As a result of this initiative comparatively, large numbers of olive ridley sea turtles were found utilizing Kodi and MKodi beaches at Kundapura Udupi. This is the first time in the history that due to beach cleaning turtles could nest. This is important because turtles are endangered species in India. • Two cleaning staffs were appointed in each beach for the cleanliness and awareness activities. • T-shirts, caps, gunny bags, masks, gloves and other cleaning materials distributed to the cleaning staffs. • Volunteers, Employees of Government sectors, private sectors, Non-Governmental organisation (NGO) and general public also participated in cleanliness drive to create awareness.

5. Awareness Programmes

Sl. No	Name of Campaign/Program	Dates of the campaign	Location	Target group	No of Participants	Summary
1	Web based awareness on beach safety measures	20.05.2020	Online	School children, teachers, tourists, local communities, BEAMS service staff, SICOM staff, BMC member of Kasarkod beach, staff of government and non-government departments, Beach Managers, beach staff, Life guards of beach and public.	100+	<p>This programme was conducted to educate participants to recognize the dangers and safety procedures necessary to guard the public, wild life and marine environment</p> <ul style="list-style-type: none"> • Mr Sanjay jala, consultant MoEF & CC and other experts in the field discussed about beach safety measures • Trained lifeguards provided beach safety tips including rescue and first aid facility available at the beaches. They also demonstrated different beach safety equipments like safety flags, life jackets etc.
2	Poshan abhiyan	29.09.2020 - 29.03.2021	School and college premises	School children ecoclub incharge teachers and public	School and college premises.	<p>To promote the Poshan abhiyan program by the ministry of women and child development, plantation of nutritious plants like herbal or nutri garden, kitchen garden, medicinal plants were initiated in the eco club school and college premises. Program aimed to reduce the level of stunting, under nutrition, anaemia and low birth weight across the country. Uttara kannada, Chamarajnagara, Chikkaballapura, Chitradurga, Sirsi, Belgaum, Gulbarga, Shivamogga, Davanagere, Chikkamagalur, Mysore, Ramanagara districts have conducted Poshan abhiyan programmes in their respective districts.</p>

Sl. No	Name of Campaign/ Program	Dates of the campaign	Location	Target group	No of Participants	Summary
3	One earth one home program by World Wide Fund for Nature-India,(WWF India)	01.10.2020	Online	School children and ecoclub incharge teachers	Information shared with 7000 schools	In association with WWF India, “one earth one home” program was implemented from October 2020 to January 2021 for eco club in charge teachers and students. Online programmes were conducted to teachers and students which included virtual walk, bird watching, expert talks, and actions at home with parents to become a green home and other activities on environment. EMPRI conferred As Best story of change for contributing towards WWF’s One Earth One Home programme in Karnataka.
4	Establishment of model Garden at Project office	04.11.2020	EMPRI project office	EMPRI staff	6	As a part of poshan abhiyan, a model garden was established at the project office premises and planted more than 90 different varieties of flowering, vegetable, medicinal plants and different tree species
5	Ek bharath shrest Bharat	24.02.2021	Ecoclub schools and online programme	School children and ecoclub incharge teachers and public	-	Ek B`harat Shreshtha Bharat programme aims to enhance interaction & promote mutual understanding between people of different states/UTs through the concept of state/UT pairing. The states carry out activities to promote a sustained and structured cultural connect in the areas of language learning, culture, traditions & music, tourism & cuisine, sports and sharing of best practices etc. Karnataka state is paired with Uttarakhand. Under this Programme’, the SNAs/ Eco-clubs of paired States/ UTs can exchange their knowledge, products, nature camping experiences, innovative activities initiated/ success stories, etc.
6	Bharat ka amrut mahotsav – 75 Green good deed activities	04.03.2021	In Ecoclub schools and online programme	School children, ecoclub incharge teachers and public	All ecoclub schools	India will be celebrating the 75 th year of Independence on 15 th August 2022 and the Government of India is planning to commemorate the occasion by organizing a 75 week long Bharat ka Amrut Mahotsav. In this context the ecoclubs have been assigned to carry out a 75 week long outreach programme starting from the first week of march 2021. A Green Good Deed to be taken up as the “Green good deed of the week. A list of 75 Green good deeds sent by MoEF&CC is translated to kannada language to disseminate information the schools.

Sl. No	Name of Campaign/ Program	Dates of the campaign	Location	Target group	No of Participants	Summary
7	Bharat ka amrut mahotsav – wetland division	11.03.2021	In Ecoclub schools and wetland sites.	School children and ecoclub incharge teachers and public	All ecoclub schools	Weekly activities need to be conducted at various wetland sites and in ecoclub schools over the course of 75 weeks.
8	Energy conservation & Environment protection education program by Petroleum Conservation & Research Association (PCRA)	01.04.2021-31.03.2022	Ecoclub schools and online programme	School children and ecoclub incharge teachers.	200 Schools	PCRA intends to conduct Education programmes on Energy Conservation through Eco Clubs schools for the students from 9 th to 12 th of classes on Energy conservation. The programme will be conducted in the schools through designated teacher of science discipline and will be implemented through State Nodal Agencies (SNA) across the country. EMPRI is assigned as the state nodal agency for Karnataka state. The main benefit of this programme will be that it is a structured programme and is based on self-sustainable model where every year new set of students will be covered in the education programmes.
9	A Documentary on NGC programme	During FY 2020-21	Ecoclub schools	School children, ecoclub incharge teachers and public	1000+	Documentary on NGC programme was made to disseminate information of NGC programme to schools and public through digital media.
10	A Children Book on environment “Makkala Chandada Parisara”	During FY 2020-21	-	School children, ecoclub incharge teachers and public	-	A Children book on environment by name “Makkala Chandada Parisara” was prepared to circulate among ecoclub schools to create awareness. This Book was authored by Mr. Nagesh Hegde, an author, journalist, environmentalist, publisher and professor.

6. Training Programmes under NGC Programme

Sl. No	Name of the campaign	Date of the campaign	Location	Target group	No of participants	Summary
1	NGC-District Nodal officers Workshop	27/11/2020	Online	NGC-District Nodal officers	34	Briefed about objectives of NGC and innovative ideas which can be implemented at schools. Discussed the plan of action for the year 2020-21. Interactive session and discussions were held to implement NGC programme effectively.
2	82-online training programmes to ecoclub incharge teachers.	18/01/2021 to 05/03/2021	Online	Eco-club In-charge Teachers	11309	A total of 82 online trainings for Ecoclub incharge teachers of 34 educational districts were conducted. Detailed presentation on implementation of NGC programme was delivered by Sathyashree, Programme Officer, NGC and interactive session was held with NGC staff.
	Online training programme on Wet waste & Dry waste	19.01.2021	Online	Eco-club In-charge Teachers	325	Resource person Kumaraswamy, Former Member secretary KSPCB delivered a presentation on Wet waste & Dry waste and discussed on the importance of segregation of waste at source.
	Online training programme on rainbow 7 color wonder	25.01.2021	Online	Eco-club In-charge Teachers	293	Resource person Radheshyam balaji, Retd Additional director, CPCB delivered a presentation on rainbow 7 color wonder and explained the Raman's effect.
	Online training programme on "China patna toxins vs Channapatna toys"	27.01.2021	Online	Eco-club In-charge Teachers	445	Resource person, Smt Lakshmi Balaji, retired teacher delivered a presentation on China patna toxins vs Channapatna toys and on "Plastic a friend greatly misused."
	Online training programme on "Air and noise pollution"	28.01.2021	Online	Eco-club In-charge Teachers	301	Resource person, Mahesh Kashyap, Consultant delivered a presentation on air and noise pollution, its effects and control.
	Online training programme on "Greenhouse gas and climate change"	29.01.2021	Online	Eco-club In-charge Teachers	410	Resource person Mahesh Kashyap, Consultant, delivered a presentation on "Greenhouse gas and climate change"

Sl. No	Name of the campaign	Date of the campaign	Location	Target group	No of participants	Summary
	Online training programme on Air pollution and health hazard	01.02.2021	Online	Eco-club In-charge Teachers	437	Resource person, Smt Lakshmi Balaji , Retired teacher delivered a presentation on on Air pollution and health hazard
	Online training programme on “Water, our lifeline”	02.02.2021	Online	Eco-club In-charge Teachers	315	Resource person Smt Lakshmi Balaji , Retired teacher delivered a presentation on “Water, our lifeline”.
	Online training programme on “Water, our lifeline”	03.02.2021	Online	Eco-club In-charge Teachers	390	Resource person, Smt Lakshmi Balaji , retired teacher delivered a presentation on “Water our lifeline”
	Online training programme on “Our environment how and why we should care for it”	04.02.2021	Online	Eco-club In-charge Teachers	454	Resource person, Smt Lakshmi Balaji , retired teacher delivered a presentation on “Our environment how and why we should care for it”
	Online training programme on “Our environment how and why we should care for it”	05.02.2021	Online	Eco-club In-charge Teachers	360	Resource person, Smt Lakshmi Balaji , retired teacher presented a presentation on “Our environment how and why we should care for it”
3	NGC online training programme by Centre for Environment Education (CEE) on Tide Turner’s plastic challenge	22.02.2021, 25.02.2021, 03.03.2021& 05.03.2021	Online	Eco-club In-charge Teachers	1178	Resource person from CEE delivered a presentation on Tide Turner’s plastic challenge which included harmful effects of plastic and alternative to plastic.
4	Training programme to EMPRI Volunteer	06.03.2021	Online	EMPRI Volunteers	10	Discussed about role of EMPRI volunteers in different awareness activities of EMPRI.
5	Training Programme by PCRA	31.03.2021	Online	Eco-club In-charge Teachers	200+	A training programme on Energy Conservation & Environment Protection Education Programme was organized for ecoclub in charge teachers to implement the programme in their respective schools.

7. Meetings

Sl. No	Date	Details of activities	Participants	Location	Summary
1	14/07/2020	State Steering Committee (SSC) meeting	Members of SSC	Video conference	In the meeting, Proceedings and action taken report of previous SSC meeting were noted and confirmed. Committee reviewed the progress, approved action plan and budget of NGC programme for the year 2020-21.
2	FY 2020-21	District Implementation & Monitoring Committee (DIMC) Meeting in 16 districts	DIMC members	District Commissioner Office of Haveri, Madhugiri,, Chikmagalur, , Chitradurga, Chikballapura, , Kolar, Ramanagara, Udupi, Koppal, Shimoga, Davanagere, Chikkodi, Chamarajnagar, Hasan, Mandya and Darwad districts	Discussed about effective implementation of NGC programme at district level.

8. Other Initiatives

- **EMPRI volunteer program:** To catalyse people and collage/university students who have passion to work for environment, EMPRI has initiated a program called EMPRI volunteer program, it helps in creating robust network and feedback on environmental issues like plastic ban implementation; open defecation free villages; survey; impact of climate change in their locality etc. to achieve the goal of conservation of environment.

9. Achievements

- **NGC Application software:** Web based online and mobile enable user friendly software application is developed for NGC Programme of Karnataka State. Application software helps EMPRI, Schools and nodal officer of NGC to manage NGC programme efficiently and drastically reduce the paperwork. It also directly connects schools, districts and EMPRI. Application software has been developed by Centre for Smart governance. Government of Karnataka.
- **Best Story of Change award to EMPRI :** World Wide Fund for Nature-India (WWF) conferred EMPRI As Best Story of Change award for contributing towards WWF's One Earth One Home Programme in Karnataka

10. NGC Team's Visit to Schools: NGC team of EMPRI visited total of 1700 schools from all 34 educational districts

Sl No.	District Name	No of Schools Visited	Sl No.	District Name	No of Schools Visited
1	Bagalkot	-	18	Gulbarga	90
2	Bengaluru North	80	19	Hassan	84
3	Bengaluru Rural	20	20	Haveri	-
4	Bengaluru South	20	21	Kodagu	50
5	Belgaum	101	22	Kolar	75
6	Bellary	90	23	Koppal	16
7	Bidar	124	24	Madhugiri	50
8	Bijapur	90	25	Mandya	75
9	Chikkaballapura	8	26	Mysore	-
10	Chamarajanagara	60	27	Raichur	-
11	Chikkodi	45	28	Ramanagara	40
12	Chikamagaluru	20	29	Shimoga	63
13	Chitradurga	-	30	Sirsi	116
14	Dakshina Kannada	-	31	Tumkur	65
15	Davangere	-	32	Udupi	-
16	Dharwad	42	33	Uttara Kannada	101
17	Gadag	83	34	Yadgir	60
Total			1668		

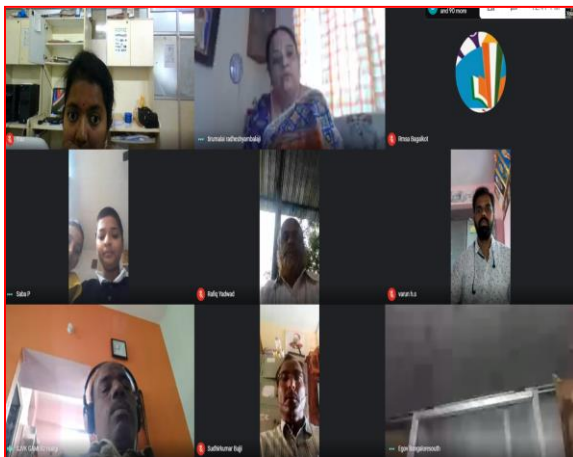
11. Photo Gallery –National Green Corps



Drawing by students in drawing competition - World Earth day



Planting saplings by R K Singh, Director General EMPRI- World Environment Day celebration



Resource person Smt Lakshmi Balaji and participants at the webinar- World Ozone Day Celebration



Importance of Wet Land Day-A Talk by NGC staff - World Wet Land Day Celebration



Participants of World Water day celebration



Constitution Preamble read by EMPRI staff Constitution day

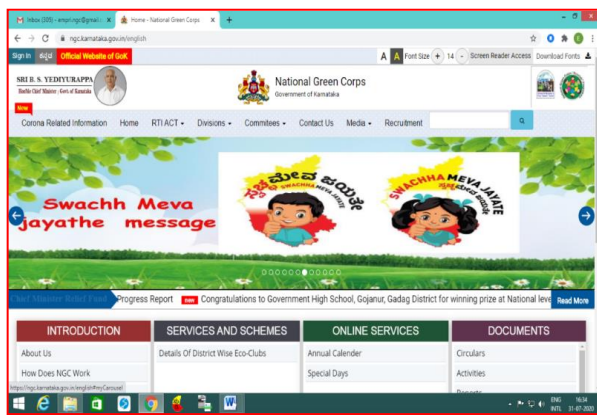
Activities under Swachhta Action Plan (SAP)



Distributing flyers to public at Majestic - Dust to dustbin campaign



Distributing masks and sanitizers to the Staff of BMTC - Distribution of masks and sanitizers



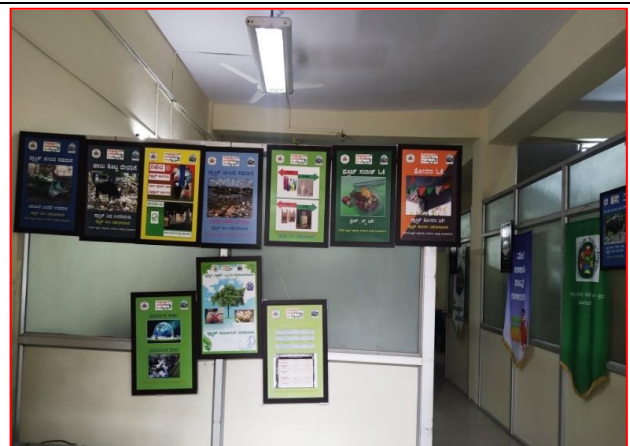
Swachhata messages displayed on the website of NGC -Display of Swachhata Messages on the website



Online Photo competition on biodiversity of moths



Distribution of Hand washes to underprivileged



Display of Plastic ban messages in front office - Display of Swachhata Messages in office

Online Competition for school children

Environmental Management & Policy Research Institute (EMPRI)
National Green Corps (NGC)

Online Competitions for School Children

Slogan Writing Competition
Theme : Swachh Bharath/ Clean India
Participants : Class 4 to Class 7

Drawing/Painting Competition
Theme : Covid-19 Awareness
Participants : Class 8 to Class 10

Instructions:

- These photos will be used for document purpose by EMPRI
- Students can write slogan in Kannada or English
- Slogan Should be his/her original creation and not copied or reproduced.
- Last date for Submission of entries 08-August-2020, 8:30 PM.
- Participants details required: Name, class, School name & Address, Phone number.
- ID Proof: upload any ID proof like School ID, Aadhaar card, Ration Card
- Send your photo/File (JPEG/PDF Format only) along with description and details to the E-mail address: empri_stp@gmail.com

Prizes will be given to top 3 best drawings & Slogans

Environmental Management & Policy Research Institute (EMPRI)
(Government of Karnataka Undertaking)
"Hainu Bhavana", Directorate Forest Campus, Vinayachandrapura Circle, J.P.Nagar 3rd Phase, Bangalore-560075.
Tel: 080-44444444
Web: www.empri.karnataka.gov.in
www.ngc.karnataka.gov.in



Drawing on COVID -19 by prize winners



Plantation by NGC staff



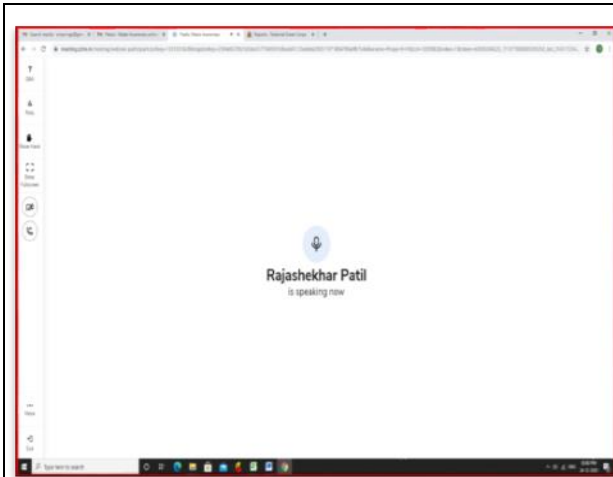
Oath taken by staffs of MLA College and NGC team - Harit Diwali-Swasth Diwali



webinar on E-waste Management



Distribution of flyers to the Public at Devanahally Rural areas



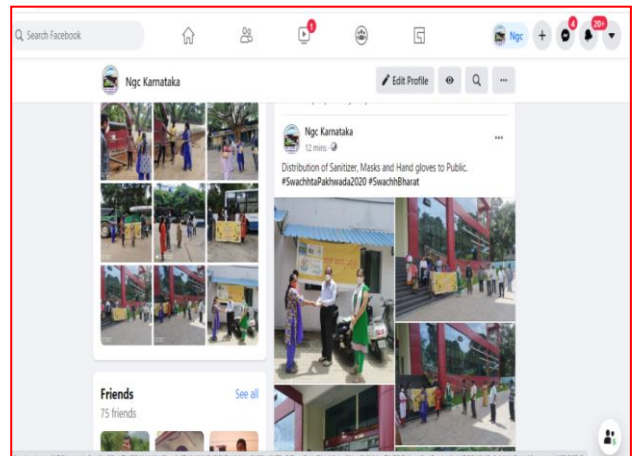
Plastic ban awareness through webinar by Resource person Rajshekar Patil - Webinar on Plastic-Ban Awareness



Distribution of plastic ban awareness flyers to the public at Malleshwaram - Plastic-Ban Awareness

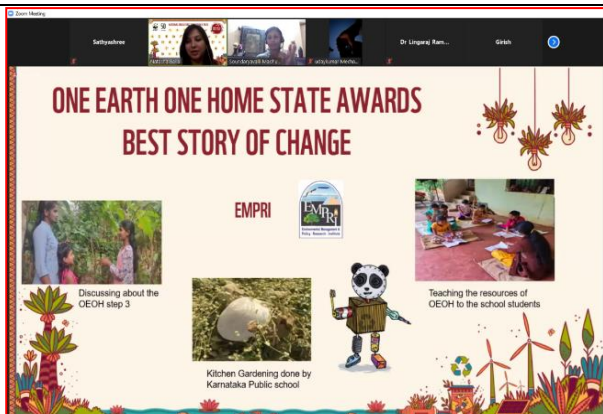


Students at Essay writing competition - Antilitter campaign and Covid-19 Awareness program



NGC activities promoted through social media

One earth one home program



Best Story of Change Award to EMPRI



Best Story of change Award to EMPRI by Ms. Soundarya Valli, Head- Karnataka State Office,

WWF-India,

Adoption of 5 coastal beaches for cleanliness & awareness Programmes



Cleaning activity by volunteer's at Gokarna beach

Beach cleaning activity published in regional language newspaper



Waste at beach before cleaning

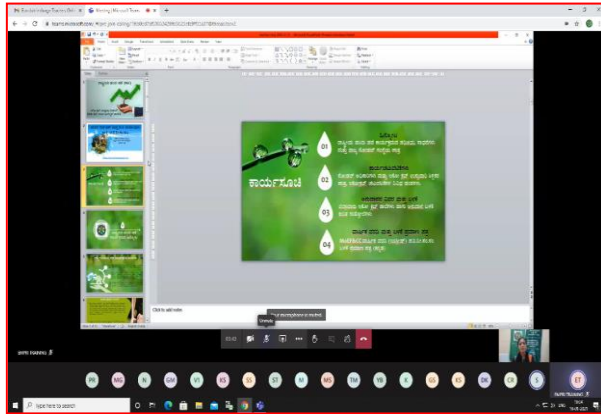
Waste collected after cleaning



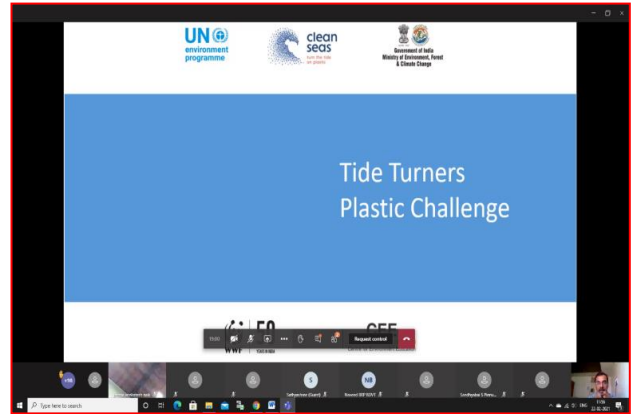
Poshan abhiyan at Davanagere district

DIMC meeting at Davanagere district

Training Programmes-NGC



Presentation by Sathyashree, Programme Officer, NGC at online trainings



Tide turners plastic challenge training by staff of Centre for Environment Education

School visit by NGC staff



School visit by Programme Officer to Uttara Kannada district



School visit by Programme Coordinator to Udupi



Address by Programme officer NGC at Malleswaram Ladies Association high school-



Children book "Makkala chandada parisara"

CHAPTER 3

HUMAN RESOURCES

3.1 Officers on Deputation from Government of Karnataka and Karnataka State Pollution Control Board

Sl.	Name	Designation	Date of joining	Date of leaving
1	Shri. Raj Kishor Singh, IFS, PCCF	Director General	31-05-2019	06-05-2020
			06-05-2020 Concurrent charge	01-01-2021
			25-03-2021 Additional Charge	--
2	Shri Brijesh Kumar Dikshit IFS, PCCF	Director General	01-01-2021	25-03-2021
3	Dr. K.H.Vinaya Kumar, IFS, CCF	Director (Research)	13.09.2011 Concurrent charge	30-06-2020 (Retired)
			04-03-2021 Additional charge	--
4	Shri. T.Mahesh	Technical Director-Environment	02-12-2020 (Concurrent Charge)	--
5	Shri. Ramesha C.	Director (Research)	01-07-2020 Additional Charge	04-03-2021
		Project Development Officer	31.08.2017	04-03-2021
6	Smt. Nausheen Jabeen	Gazetted Manager	22.05.2017	--

3.2 EMPRI Fellow: Government of Karnataka issued an order (FEE 43 ENV 2019, Bengaluru, dated:19-11-2019)for establishing Climate Change Peetha and Environmental Management and Conservation Peetha along with selecting EMPRI fellows for each peetha. Details of EMPRI fellows are given below.

Sl. No.	Name	Designation	Date of joining
1.	Dr. K.H. Vinayakumar IFS, (Rted)	EMPRI Fellow-Environment	21-08-2020
2.	Dr. Deepika Swami	EMPRI Fellow Climate Change	01-10-2020

3.3 Details of outsourced employees-2020-21

3.3.1. Employees have been outsourced through manpower agency for carrying out various projects as on 31st March, 2020-21.

Sl. No.	Positions	Centre for Climate Change & DST	Centre for Lake Conservation / Water analysis Lab	Centre for Capacity Building	NGC-#1	ENVIS-#2	DHPC-#3	Quality Assurance Cell	Total
1	Project Coordinators	-	1	-	-	-	1	-	2
2	Sr. Consultant	1	-	-	-	-	-	-	1
3	Research Scientists	2	1	-	-	-	2	-	5
4	Research Associates	2	2	-	-	-	3	-	7
5	Quality Assurance	-	-	-	-	-	-	1	1

Sl. No.	Positions	Centre for Climate Change & DST	Centre for Lake Conservation / Water analysis Lab	Centre for Capacity Building	NGC- *1	ENVIS- *2	DHPC-*3	Quality Assurance Cell	Total
	Manager								
6	Jr. Research Fellow	1	-	-	-	-	-	-	1
7	Project Associates	5	-	-	-	-	-	-	5
8	Technical Assistants	-	2	-	-	-	1	-	3
9	Lab Chemists	-	3	-	-	-	-	-	3
10	Lab Technicians	-	4	-	-	-	-	-	4
11	Training Head	-	-	1	-	-	-	-	1
12	Training Associates	-	-	2	-	-	-	-	2
13	Training Assistants	-	-	2	-	-	-	-	2
14	Programme Officers	-	-	-	1	1	-	-	2
15	Programme Coordinator	-	-	-	2	-	-	-	2
16	Information Officer	-	-	-	-	1	-	-	1
17	IT Officer	-	-	-	-	1	-	-	1
18	Programme Associates	-	-	-	2	-	-	-	2
19	IT Assistant	-	-	-	1	-	-	-	1
20	Project Assistants/ Field Assistants	6	2	-	-	-	1	-	9
21	Para Taxonomist/ Data Entry operator	-	1	-	-	-	-	-	1
22	Lab Attenders	2	1	-	-	-	-	-	3
23	Dalayath	-	-	-	1	-	-	-	1
	Total	19	17	5	7	3	8	1	60

*1: NGC-National Green Corps, *2:ENVIS- Environmental Information System, *3:- DHPC- Impact Assessment of Downhill Pipe Conveyor on Ambient Environment.

3.3.2. Employees have been outsourced through manpower agency for the office management as on 31st March, 2021.

Sl. No.	Positions	Administration	Accounts	Library	Total
1	Manager	1	1	-	2
2	System Administrator	1	-	-	1
3	Librarian	-	-	1	1
4	Office Assistant	1	-	-	1
5	Jr. Office Assistant	1	-	-	1
6	Computer Operator	1	-	-	1
7	Stenographer/Data Entry Operator	1	-	-	1
8	Account Assistants	-	2	-	2
9	Jr. Account Assistant	-	1	-	1
10	Drivers	5	-	-	5
11	Dalayaths	3	-	-	3
12	Housekeeping	3	-	-	3
13	Security	4	-	-	4
	Total	21	4	1	26

3.3.3. Number of employees who have resigned from the service of EMPRI /worked part time for short term period

Sl. No.	Positions	Centre for Climate Change & DST	NGC	Centre for Lake Conservation/ Water Analysis Lab	ENVIS	Total
1	Research Scientist	1	-	-	-	1
2	Research Associate	-	-	1	-	1
3	Project Associate	3	-	-	-	3
4	Project Assistant/Field Assistant	1	-	-	-	1
5	Technical Assistant	-	-	1	-	1
6	Information Officer	-	-	-	1	1
7	IT Officer	-	-	-	1	1
8	IT Assistant	-	1	-	-	1
9	Parataxonomist//Data Entry Operator	-	-	-	1	1
10	Programme Associate	-	2	-	-	2
11	Programme Assistants	-	26	-	-	26
12	Lab Attender	-	-	1	-	1
Total		5	29	3	3	40

3.4 Auditors: Following are the Auditors for the EMPRI

Statutory Auditor	Internal Auditor
M/s. N N R & Co. Chartered Accountants No. 163, II Floor, Rajeshwari Complex Above Karnataka Bank Ltd., R.V. Road Bengaluru – 560 004.	M/s. Mahesh & Nagaraj Chartered Accountants No – 479, Shell Petrol Bunk, Tumkur Road, Bangalore

Annexure - 1: Governing Body Committee Members

Sl No	Members	Designation
1	Additional Chief Secretary Forest, Ecology & Environment Dept. Government of Karnataka, Room No. 448, 4 th Floor, M.S. Building Bangalore	Chairperson
2	Principal Secretary Ecology & Environment Dept. Government of Karnataka Room No. 709, 7 th Floor, 4 th Gate, M.S. Building, Bangalore	Co-Chairman
3	Chairman, Karnataka State Pollution Control Board, Parisara Bhavan, 5 th Floor, Church Street, Bangalore	Member
4	Additional Chief Secretary Urban Development Dept. Government of Karnataka, Room No. 436, 4 th Floor Vikasa Soudha, Bangalore	Member
5	Commissioner for Industrial Development & Director of Industries & Commerce, Government of Karnataka, No. 49, 2 nd Floor, Khanija Bhavana, Bangalore	Member
6	Commissioner for Health & Family Welfare Services, Government of Karnataka, Ananda Rao Circle, Bangalore	Member
7	Secretary, Finance (Budget & Resource), Government of Karnataka, Room No. 250, 2 nd Floor, Vidhana Soudha, Bangalore	Member
8	Member Secretary Karnataka State Pollution Control Board, No. 49, 5 th Floor, Parisara Bhavan,, Bangalore.	Member
9	Additional Director & Zonal Officer, South Zone Office, Central Pollution Control Board, Nisarga Bhavan, 7th D Cross, Shivanagar, Bangalore.	Member
10	Director General Environmental Management & Policy Research Institute Hasiru Bhavana, Doresanipalya Forest Campus, JP Nagar 5 th Phase, Bangalore.	Member Secretary

Annexure - 2: Executive Committee Members

Sl. No	Members	Designation
1.	Director General, Environmental Management and Policy Research Institute, Bangalore	Chairperson
2	Additional Principal Chief Conservator of Forests, Research and Utilization, Karnataka Forests Department, Bengaluru	Member
3	Special Director, Dept. of Environment & Ecology, M. S. Building, Bangalore	Member
4	Internal Financial Advisor & Joint Secretary, Forest, Ecology and Environment, GoK, M.S. Building, Bangalore.	Member
5	Director, Environmental Management and Policy Research Institute, Bangalore	Member Secretary

Annexure - 3: Research & Training Advisory Committee Members

Sl. No	Member	Designation
1	Director General, Environmental Management & Policy Research Institute, Bangalore	Chairperson
2	Member Secretary, Karnataka State Pollution Control Board, No. 49, 5 th Floor, Parisara Bhavan,, Bangalore	Member
3	Additional Principal Chief Conservator of Forests, Research and Utilization, Karnataka Forests Department, Bangalore	Member
4	Former Director General of Environmental Management & Policy Research Institute , Bangalore	Member
5	Special Director (Tech.), Ecology and Environment Department, Government of Karnataka, M.S. Building, Bangalore	Member
6	Professor of Law, National Law School of India University, Nagarbhavi, Bangalore	Member
7	Chairman, CISTUP, Indian Institute of Science, Bangalore.	Member
8	Director, Institute for Social & Economic Change, Bangalore	Member
9	Additional Director & Zonal Officer, Central Pollution Control Board(South), Bangalore	Member
10	Director Institute of Wood Science and Technology, Bangalore	Member
11	Fellow (Centre of Environmental Studies), Southern Regional Centre (TERI), Bangalore	Member
12	Director, Environmental Management and Policy Research Institute, Bangalore	Convener

Annexure - 4: Selection Committee Members

Sl. No.	Members	Designation
1	Director General/Director Environmental Management & Policy Research Institute, Bangalore	Chairperson
2	Additional Principal Chief Conservator of Forests (Research & Utilisation)	Member
3	Director/Director (Research), Environmental Management & Policy Research Institute, Bangalore	Member
4	Special Director (Technical), Dept. of Ecology & Environment, GoK.	Member
5	Member Secretary, Karnataka State Pollution Control Board, Bangalore	Member
6	Member Secretary, Karnataka Biodiversity Board	Member
7	Project Development Officer, Environmental Management & Policy Research Institute, Bangalore	Member

Annexure-5: Internship Committee Members.

Sl. No.	Members	Designation
1	Director General, Environmental Management & Policy Research Institute, Bangalore	Chairperson
2	Director, Environmental Management and Policy Research Institute, Bangalore	Member
3	Director (Research, Environmental Management and Policy Research Institute, Bangalore	Member
4	Professor, National Law School of India University, Bangalore	Member

Annexure-6: Technical Advisory Panel Members

Sl. No.	Members	Designation
1	Director General Environmental Management & Policy Research Institute Bangalore	Chairperson
2	System Analyst, DPAR, (e-Governance), Bangalore	Member
3	Representative of IIT, Bangalore	Member
4	Representative, IIMB, Bangalore	Member
5	Director (Research), Environmental Management & Policy Research Institute, Bangalore	Convener

Annexure- 7: Internal Complaint Committee: [Under Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act 2013]

Sl. No.	Members Details	Designation
1	Smt. Nousheen Jabeen, Gazetted Manager , Environmental Management & Policy Research Institute, Bangalore	Chairperson
2	Dr. O. K. Remadevi, Sr. Consultant. Centre for Climate Change, Environmental Management & Policy Research Institute, Bangalore	Member
3	Dr. Tanzeem Fathima, Research Scientist, Environmental Management & Policy Research Institute, Bangalore	Member
4	Smt. Siri H P, Programme Officer, ENVIS, Environmental Management & Policy Research Institute, Bangalore	Member
5	Smt. Komala D., Programme Coordinator, National Green Corps, Environmental Management & Policy Research Institute, Bangalore	Member
6	Smt. Latha M. H., Training Associate, Environmental Management & Policy Research Institute, Bangalore	Member
7	Smt. Prathibha Ghorpade, Laboratory Chemist, Environmental Management & Policy Research Institute, Bangalore	Member
8	Smt. Pushpa, House Keeping , Environmental Management & Policy Research Institute, Bangalore	Member
9	Assistant Director, Department of Women and Child welfare	Member
10	Woman representative from Department of Police	Member
11	Woman representative from SAAHAS (NGO) Bangalore	Member

Annexure- 8: Trainings/Workshops Conducted During the Year 2020-21

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
1	09-05-2020	e-waste Management Rules -2016	Officers and Staff of various departments, Corporates, NGO's, Educational institutes, RWA's and general public	18	Online
2	24-06-2020	Plastic Ban Notification -2016	Officers and Staff of various departments, Corporates, NGO's, Educational institutes, RWA's and general public	25	Online
3	29-06-2020	Butterfly Monitoring of in Program for Karnataka	Officers and Staff of forest dept., education dept., students and general public	18	Online
4	03-07-2020	Training program on Bio- Medical Waste Management Rules - 2016	Medical officers and para medical staff of health care establishments (Human and Animal)	30	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
5	09-07-2020	Solid Waste management byelaws (2020) BBMP	Officers and Staff of BBMP and General public	60	Online
6	10-07-2020	Hazardous and other waste management rules-2016 and its compliance	Industries, Departments, corporates, ULB's NGO's and general public	145	Online
7	13-07-2020	e-waste Management Rules -2016	Eco-club teachers	26	Online
8	15-07-2020	Impacts of climate change on coastal diversity	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	36	Online
9	17-07-2020	Air pollutants	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	49	Online
10	21-07-2020	Air pollution and its health effects	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	36	Online
11	23-07-2020	Methodology of Hazardous waste management sampling and handling	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	77	Online
12	29-07-2020	Sustainable Buildings to mitigate climate change	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	46	Online
13	30-07-2020	Water and Waste Water management in Urban areas	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	15	Online
14	31-07-2020	Environmental Laws	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	15	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
15	01-08-2020	Climate Change in India – Impacts on Natural Resources Sector and need for Adaptation	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	24	Online
16	04-08-2020	Environmental Laws	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	20	Online
17	05-08-2020	Water Testing Instruments and Their Principles	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	38	Online
18	06-08-2020	Environmental Concerns In Common Law And Criminal Law	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	18	Online
19	07-08-2020	Constitutional Conspectus Of Environmental Governance	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	14	Online
20	10-08-2020	Decentralisation, Communitarian Control over and Engagement in , Resource Management	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	52	Online
21	10-08-2020	KTPP Act	EMPRI Staff	40	Conference Hall, Environmental Management and policy research institute
22	13-08-2020	Constitutional Right to Environment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	42	Online
23	15-08-2020	Safe Water Drinking	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	47	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
24	17-08-2020	Industrial Pollution & Control	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	74	Online
25	18-08-2020	Impact of Air Pollution on Carbon Foot Print	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	60	Online
26	19-08-2020	Environmental Protection Act 1986	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	23	Online
27	21-08-2020	Law of Pollution Control and Administration (i)	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	34	Online
28	24-08-2020	Law of Pollution Control and Administration (ii)	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	32	Online
29	25-08-2020	Impact of Carbon foot Print on Economic Development	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	33	Online
30	26-08-2020	Understanding Noise	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	30	Online
31	27-08-2020	Water Sampling Techniques / Objectives	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	48	Online
32	28-08-2020	Pollution Control Administration and its Powers of Consent & Setting Standards	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	32	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
33	29-08-2020	Do you Know What Quality of Air We Breathe.?	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	107	Online
34	31-08-2020	Application Of Rs And Gis In Solid Waste Management	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	131	Online
35	01-09-2020	Law Concerning to Vehicular Pollution	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	26	Online
36	02-09-2020	Covid-19, Economy & Environment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	39	Online
37	03-09-2020	Environmental Administration & Noise Pollution Law	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	28	Online
38	04-09-2020	Rural Sanitation and Environmental Laws	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	50	Online
39	05-09-2020	Update on National guidelines for BMW Management , Infection control, related issues in Covid care set ups	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	111	Online
40	07-09-2020	The Relative Status & Functions of CPCB and SPCB	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	30	Online
41	09-09-2020	Effects of Air Pollutants on Human Health & Environment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	82	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
42	10-09-2020	Pollution Control Administration Challenges and Solutions	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	27	Online
43	11-09-2020	Faecal Sludge Management	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	19	Online
44	12-09-2020	Sustainable Transportation	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	39	Online
45	14-09-2020	Environmental Impact Assessment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	51	Online
46	15-09-2020	Utilization of Industrial waste in construction	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	69	Online
47	16-09-2020	Environmental Impact Assessment(Draft 2020)	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	27	Online
48	18-09-2020	Development of projects & Environmental Safeguards	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	23	Online
49	18-09-2020	Impact of Vehicular Pollution	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	40	Online
50	19-09-2020	Water Supply and Treatment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	21	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
51	21-09-2020	Environment Management Systems (EMS)	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	17	Online
52	22-09-2020	Controlling Air Pollution	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	29	Online
53	23-09-2020	Urban Development , Industrial Siting and Addressing Environmental Concerns	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	15	Online
54	24-09-2020	Role of Sewage Treatment Plants and Common Effluent Treatment Plants in Abatement of Water Pollution	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	21	Online
55	25-09-2020	Climate Change and Clean Development- UNFCCC	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	70	Online
56	25-09-2020	Effect of Global Warming	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	29	Online
57	26-09-2020	Solid waste Collection and transportation- Design and operation	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	97	Online
58	28-09-2020	Kyoto Protocol	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	11	Online
59	29-09-2020	Application of Geo-informatics to identify Groundwater Pollution.	Officers and Staff of various departments, Corporates, NGO's, Edul. institutes and general public	60	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
60	30-09-2020	Paris Agreement	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	19	Online
61	30-09-2020	Ozone hole Impact	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	47	Online
62	01-10-2020	Climate Change Risks and Need for Building Resilience	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	22	Online
63	03-10-2020	Composting system - design and operation – An Environmental friendly approach to convert waste to wealth	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	68	Online
64	05-10-2020	India Case Study: National Rendezvous For Climate Justice	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	11	Online
65	06-10-2020	Water Sustainability	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	12	Online
66	07-10-2020	Biodiversity Law	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	09	Online
67	08-10-2020	Self Care During Covid Care	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	73	Online
68	09-10-2020	Convention on Biological Diversity & Two Protocols	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	37	Online

69	09-10-2020	Effects of Photochemical Pollutants	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	22	Online
70	10-10-2020	Catch every drop- Water Conservation by Rain Water Harvesting	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	98	Online
71	12-10-2020	Indian Biodiversity Law	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	41	Online
72	13-10-2020	Green GDP and Sustainable Development in India	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	75	Online
73	14-10-2020	Indian Biodiversity Law A. <u>Exceptions</u> B. <u>Biosafety</u>	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	85	Online
74	15-10-2020	Fundamentals of GHG Inventorization	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	99	Online
75	16-10-2020	Biodiversity Law- Experiment in Deepening Democracy	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	44	Online
76	16-10-2020	Acid Rains and its effects on Human Health & Environment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	62	Online
77	17-10-2020	Eco friendly recycling of Granite fines waste in Construction	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	102	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
78	19-10-2020	Indian Forest Law	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	63	Online
79	20-10-2020	Forest Conservation Law & Practices	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	29	Online
80	21-10-2020	Climate Smart Cities Self-Assessment Tool	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	84	Online
81	22-10-2020	Developing sectoral GHG emission estimates at state and city level*	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	154	Online
82	23-10-2020	How to Control Air Pollution?	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	136	Online
83	24-10-2020	Sustainable Design and Operation of Sanitary landfill	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	62	Online
84	27-10-2020	Wildlife Protection Act	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	134	Online
85	28-10-2020	Urban Community Resilience Assessment to Climate Risks	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	32	Online
86	29-10-2020	Types of Water Pollution	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	264	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
87	02-11-2020	Forest Rights Act	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	17	Online
88	03-11-2020	Self-curing Concrete to Eliminate Water Wastage in Construction	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	87	Online
89	04-11-2020	Sustainable Menstrual Care Options	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	85	Online
90	05-11-2020	Wetland Technologies for Environmental Benefit	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	110	Online
91	06-11-2020	Coastal Environment Management	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	38	Online
92	06-11-2020	Water Pollution Sources	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	129	Online
93	07-11-2020	Water sampling-preservation, transportation and analysis techniques	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	140	Online
94	09-11-2020	Ecologically Sensitive Zones	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	50	Online
95	10-11-2020	Waste and Resource recover-Australian Regulatory Context	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	99	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
96	11-11-2020	Global e-Waste Scenario and its Challenges and Opportunities in Business	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	78	Online
97	12-11-2020	Wetlands and Water Bodies	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	48	Online
98	13-11-2020	Types of Water Pollutants & Effects	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	160	Online
99	17-11-2020	Legal Frame for Waste Management Principles, Process, & Mechanisms	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	74	Online
100	18-11-2020	Introduction to Phytoremediation	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	85	Online
101	19-11-2020	Hazardous Wastes and Substances and their Management	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	12	Online
102	20-11-2020	Industrial Pollution and its Treatment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	112	Online
103	21-11-2020	Bioremediation	Officers and Staff of selected urban local bodies	22	Online
104	24-11-2020	Hazardous Waste Tracking and Data system	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	20	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
105	25-11-2020	Best Practices in e-Waste business-a case study of Singapore Waste Management	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	113	Online
106	26-11-2020	Hazardous Wastes & Biomedical Wastes Law in India	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	90	Online
107	27-11-2020	Sewage Treatment Plants and Recycling of Treated effluent	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	105	Online
108	28-11-2020	Waste water treatment- An effective way of recycling used water	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	15	Online
109	30-11-2020	Mainstreaming Climate Action and Disaster risk Management into Development Planning	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	77	Online
110	02-12-2020	Environment Development & Quality of life	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	56	Online
111	04-12-2020	Solid Waste Management Law	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	53	Online
112	05-12-2020	Soil pollution and its effects	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	192	Online
113	07-12-2020	Environmental Justice- Formal Frame of Justice Dispensation	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	25	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
114	08-12-2020	Dealing with Climate Change	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	118	Online
115	09-12-2020	Cities Steering towards Sustainability	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	57	Online
116	10-12-2020	Environmental Justice and Courts	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	46	Online
117	11-12-2020	Forest Resources – Degradation, Livelihood & CC	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	52	Online
118	14-12-2020	Accessing and Securing Justice with in the Environmental Statutory Frame, Public Liability Insurance Act & Environment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	121	Online
119	15-12-2020	Water Resources Efficiency & Equatable Access	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	42	Online
120	16-12-2020	Biological diversity conservation and benefit sharing	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	25	Online
121	17-12-2020	Environmental Justice by National Green Tribunal-1	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	58	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
122	18-12-2020	Sources of Radio Active Pollution & its Effects on Human Health	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	28	Online
123	19-12-2020	Role of Public, Private & NGO's with ULB's in Sustainable Waste Management	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	64	Online
124	21-12-2020	Environmental Justice by National Green tribunal -2	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	17	Online
125	22-12-2020	Phytoremediation	Officers and Staff of selected urban local bodies	54	Online
126	24-12-2020	Thermal Pollution and its effects on Human Health and Environment	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	86	Online
127	24-12-2020	Plastic Waste Awareness	Harnahally Ramaswamy higher education institute students	513	Harnahally Ramaswamy higher education, Hassan
128	26-12-2020	Ground water pollution around landfills	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	34	Online
129	30-12-2020	Noise Pollution and its effects	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	63	Online
130	02-01-2021	Energy access & Off-grid power by Solar Energy-A Small & Medium Enterprise Perspective	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	41	Online

Sl. No.	Date	Details of training/Workshop	Target Participants	No. of participants	Venue
131	08-01-2021	Co Digestion	Officers and Staff of various departments, Corporates, NGO's, Educational institutes and general public	17	Online
132	21-01-2021	Phytoremediation	Officers and Staff of selected urban local bodies	18	Online
133	16-02-2021	Phytoremediation	Officers and Staff of selected urban local bodies	47	Online
134	19-02-2021	Phytoremediation	Officers and Staff of selected urban local bodies	14	Online
135	20-02-2021	Awareness on environment	HR Institute of Hassan	50	Hassan
136	26-02-2021	Phytoremediation	Officers and Staff of selected urban local bodies	17	Online
137	23-12- 2020	Waste and Waste Water Treatment Plant- technician (2)	PUC, Degree, Diploma, BE	19	EMPRI
138	08-03-2021	Waste and Waste Water Treatment Plant- technician (3)	PUC, Degree, Diploma, BE	26	EMPRI
Total				8129	