FACULTY OF ENGINEERING

DAYALBAGH EDUCATIONAL INSTITUTE (Deemed University)

(1.1 Institute of TEQIP-III)

AGENDA of THE MEETING of

BOARD OF GOVERNORS

Venue:

Seminar Hall Complex
D.E.I.

On

Saturday, 29th February 2020, at 11:00 AM

Faculty of Engineering
Dayalbagh Educational Institute (Deemed University)
Dayalbagh, Agra – 282005
Uttar Pradesh, INDIA

Meeting of Board of Governors – 29.02.2020

Venue: Seminar Hall Complex, D.E.I.

Date: 29.02.2020 Time: 11:00 AM

S. No	Name	Designation	Position in BoG
1.	Sh. Ravi Kumar Sinha	Former CEO and Managing Director, SRF Ltd., New Delhi	Chairman
2.	Sh. Rajiv Sinha	Senior Advisor, DCM Sriram Ltd., New Delhi	Member
3.	Prof. Prem Kumar Kalra	Professor, Indian Institute of Technology, Delhi	Member
4.	Dr. Vijai Kumar	Advisor, Medical Education & Healthcare Practice, Dayalbagh, University Nominee	Member
5.	Prof. S. P. Gupta	Professor Emeritus, Indian Institute of Technology, Roorkee, AICTE Nominee	Member
6.	Prof. A. K. Saxena	Prof. & Head, Electrical Engg., Faculty of Engineering, D.E.I., Institutional Project Director – TEQIP-III	Member
7.	Prof. B. Venkateshwara Rao	Director, Institute of Science & Technology, JNTU, Hyderabad	Member
8	Prof. Rahul Swarup Sharma	Professor, Faculty of Engineering, D.E.I., Nodal Officer, Procurement, TEQIP-III	Member
9.	Sh. Guru Dayal Prasad	Nodal Officer, Finance	Special invitee
10.	Prof. Bh. Nagabhushana Rao	Mentor, DEI-TEQIP	Special Invitee
11.	Sh. Ram Chand Gupta	Assoc. Professor, Faculty of Engineering, Nodal Officer, Academic, TEQIP-III	Special invitee
12.	Dr. G. S. Sailesh Babu	Assoc. Professor, Faculty of Engineering, Start-up Coordinator, TEQIP-III	Special invitee
13.	Sh. Kumar Ratnakar	Asst. Professor, Faculty of Engineering, MIS Officer, TEQIP-III	Special invitee
14.	Sh. Anurag Gupta	Asst. Professor, Faculty of Engineering, Coordinator, Equity Action Plan, TEQIP-III	Special invitee
15	Sh. Ishant Singhal	Assistant Prof., Civil Engineering, Coordinator, Twinning	Special invitee
16	Dr. Ashok Yadav	Asst. Professor, Faculty of Engineering, Coordinator, Environment Management Plan	Special invitee
17	Prof. K. Hans Raj	Head, Mechanical Engineering	Special invitee
18.	Prof. D. K. Chaturvedi	Head, Footwear Technology	Special invitee
19.	Prof. D. Bhagwan Das	Professor, Faculty of Engineering, D.E.I, Coordinator, TEQIP-III.	Member
20.	Prof. V. Soamidas	Dean, Faculty of Engineering, D.E.I.	Member Secretary

Faculty of Engineering
Dayalbagh Educational Institute (Deemed University)

MEETING OF BOARD OF GOVERNORS
Venue: Seminar Hall Complex, DEI, on
Saturday, 29th February 2020, at 11:00 AM

AGENDA Summary

Item No.	Description of Item
PART: I Confirmation of Minutes of BoG meeting held on 30.11.2019	
01/ BoG_Feb-20	Presentation of minutes of BoG Meeting held on 30.11.2019
PART: II TEQIP-III Activities report after BoG meeting on 30.11.2019	
02/ BoG_Feb-20	A. Action Taken Report B. Presentation of report of TEQIP-III activities: Expenditure, Procurement, Academic, and Twinning
PART-III: Items for Consideration and Approval	
03/ BoG_Feb-20	Procurement proposals 1. Chairman, Advisory Committee on Education has provided a large number of reference books and other material. 10 almirahs are required to store these in the Library. A proposal has been received from Prof. D. Bhagwan Das for purchasing 10 Almirahs at a total cost of Rs. 3 lakhs 2. A proposal for procurement of ANSYS (perpetual license) and STAAD PRO (3 year license) software has been received from Prof. V Soamidas. The total cost is Rs. 11 lakhs, inclusive of GST. ANSYS will be useful for students of Civil, Electrical, Mechanical and Footwear branches, while STAAD PRO is necessary for Civil students. 3. A proposal has been received from Dr. G.S.S.Babu for purchasing ION-CUDOS software for assistance in outcome based education. The total cost is Rs. 18 lakhs, inclusive of GST, for 1 year + 5 years AMC (total 6 years) 4. A proposal has been received for purchasing 100 stools and 4 tables for use in Heat Transfers labs and Hydraulics Lab and drawing halls of the faculty. Total expected cost is around Rs. 1,50,000/-. 5. The Ph.D. Synopsis of Mr. Satinder Singh, research scholar under Prof. D G Rao, has been approved in the RDC meeting in February 2020. As per the norms of research assistantship, he is now eligible to receive a support of Rs. 25,000/- per month through TEQIP, from March 1, 2020, till the project lasts. Financial Clearance for all the above items is already approved by the finance committee from the appropriate head of accounts. 6. If finance is available, the proposal received from Dr Gufran Ahmed to purchase a Simulation Software for simulating Power devices, Semi conductor devices, Solar cells, etc. for lab and research purpose costing Rs. 10,00,000 will be permitted.
04/ BoG _Feb-20	Approval for providing seed money of Rs. 2,00,000 each for R&D to faculty members of Faculty of Engineering: Some minor research proposals for funding have been received from staff of the Faculty of Engineering. The research student will also join this activity. These proposals are approved by the Finance Committee.

	1. Dr. V Soamidas, Dr. A Sahai, Dr. A Yadav, Dr. S Saxena – River Bank Filtration 2. Dr. Ashok Yadav – Direct sub-surface water recharge system
05/ BoG _Feb-20	Twinning Activities: Twinning Proposals received from IST-JNTUH may be considered for matching funding of Rs. 2,00,000.00 from DEI-TEQIP. The proposal is approved by the finance committee. 1. Ch. Sasikala - Ashok Yadav, Ranjit Kumar / Bioaerosol (revised proposal being resubmitted)
PART-IV: ITEMS FOR INFORMATION	
06/ BoG _Feb-20	1. The following programs of Faculty of Engineering have been accredited by the National Board of Accreditation for three years (July 2019 to June 2022): A. B.Tech. in Electrical Engineering B. B.Tech. in Mechanical Engineering 2. Dayalbagh Educational Institute has been awarded the FIRST RANK in the prestigious UTKRISHT SANSTHAN VISHWAKARMA AWARD-2019 for its significant contributions in the growth and development of adopted village. 3. The following workshops were conducted since the last meeting of the BoG: A. Workshop on Waste Management, December 20-21, 2019 B. IIC Workshop conducted during 3-4 January 2020 C. Hindi Kavita Workshop, February 5-10, 2020 4. A 5-day Short Term Course on "Microgrid Opportunity: Renewable Energy Resources and Buildings" is proposed to be conducted during March 23-27, 2020, by Dr. Gufran Ahmed, Dr. Rajeev Chauhan, and Dr. Subho Upadhyay for students, staff, and research scholars (open for all). 5. Most of the items proposed to be supported by TEQIP for Agile Manufacturing Lab., were already approved for procurement of Fab. Lab. and are being proposed to be procured by March 2020 by Prof. Rahul Swarup Sharma. These items were already approved by Institute G.B. in 2018. 6. The NBA accreditation of the Department of Civil Engg. is due and is in the process of submitting its Pre-Qualifier. Once it is approved by NBA, then SAR will be filed. A meeting by SPIU is organized on 5th March 2020 where the Institute has to give its consent for the same, which is mandatory. The necessary funding (application and processing fees) will be taken from TEQIP. 7. The duties of various office bearers and the charge handing over process of the officials are attached in the Annexures. 8. Following students are selected to be supported a one-time grant of $4000 CA and balance from the host Institution of CANADA as per the list given below under MITACS scheme and will spend three months at Canada under their mandatory internship program. a. Ms. Kritika Arora (Electrical Engg.) Ontario Tech University b. Ms. Gauri Sharma (Electrical Engg.) McGill University c. Mr. Rishabh Singhal (Electrical Engg.) University Laval d. Mr. Gur Ratan Satsangee (Mechanical Engg.) Univ. of Calgary
07/ BoG_Feb-20	**Any other item(s) with the permission of the Chairperson**

BIOAEROSOL AND HEALTH

A

PROJECT PROPOSAL SUBMITTED TO

IST TEQIP-III

BY

Dr. (Mrs) Ch. SASIKALA
Principal investigator
Bacterial Discovery Laboratory,
Centre for Environment,
IST., JNT University Hyderabad,
HYDERABAD - 500 085
TELANGANA

Dr. ASHOK YADAV
Principal Investigator
&
DR. RANJIT KUMAR
Co- Principal Investigator
Dayalbagh Educational Institute
(Deemed University),
Dayalbagh,
Agra-282005 (U.P)

DEI and JNTUH Research Program under Twinning Activities

Other Technical Details

1. Origin of the Proposal:

The problem of air pollution is one of the most significant issues in our country. The presence of particulates, biological molecules, and many harmful substances into earth's atmosphere causes the various types of air pollutant viz., aerosols, particulate matter, SOx, NOx, heavy metal, etc. The aerosol is a mixture of solid and liquid particles which are suspended in the atmosphere, and it's ranged from 0.01 to 100 μm. The effect of the aerosol depends upon the physical, chemical, and biological constituents of the aerosols. Air often contain micro-organisms such as viruses, bacteria, and fungi, viruses and non-living pollens, debris, etc. which are known as bio-aerosols. Bioaerosols, a group of organic aerosols ranging from ~ 10 nm to 100 μm, are airborne particles or large molecules that are either alive, carry living organisms or are released from living organisms (e.g., bacteria, fungi, virus, pollen, cell debris, and biofilms. The bioaerosol particles can range in size from 0.02 to 100 micrometers in diameter, depending on the type and source. However, they also frequently agglomerate in clusters, thereby forming more massive particles. They can be found everywhere in the troposphere, stratosphere and even over Antarctica (the most remote continent on the earth). Bioaerosols are categorized into two significant classifications: viable and non-viable. Viable microorganisms like bacteria, fungi, yeasts, and molds originate from sprays or splashes of media, from the agitations of dust, and from sneezes and coughs of which only the small particles remain in the atmosphere. Spores, which can be formed by fungi and certain bacteria, can be both viable and nonviable and are responsible for causing various diseases. It causes many kinds of diseases viz., anthrax, asthma, influenza, measles, etc. Bio-aerosols play an essential role in climate change. It harms the health status of residents of the cities of both developed and developing country. When biological particles released into the atmosphere, they travel from one place to another place along with dust particles, gets incorporated into the cloud, affects radiations and deposited to earth surface through the dry and wet deposition. These biological particles cause various kinds of diseases but least studied over the Indo-Gangetic basin.

2. Review of the status of Research and Development in the subject

2.1 International Status:

Measurements of particle formation have been performed on different platforms and over different periods around the world. Previous studies have shown that particle size plays a vital role in predicting chemical content and microbial abundance and viability in atmospheric aerosols (Lighthart et al., 1997; Vignati et al., 1999). In 1978, Bovallius and colleagues observed that airborne bacteria concentration was dependent on location and that urban areas had higher concentrations than non-urban areas. Bioaerosols play roles in atmospheric chemistry by altering the chemistry of the atmosphere via microbiological degradation (Ariya and Amyot, 2004). Various studies have established that microbes can remain viable after aerosolization from terrestrial and aquatic surfaces and can travel long distances (several meters to thousands of kilometers) before deposition (Maron et al., 2005; Dueker et al., 2011). This aerial transport mechanism represents a potential public health

concern in many urban areas, where terrestrial and aquatic pollution is prevalent. Essential sources for microbial aerosol content include shedding from larger organisms (Lighthart et al., 1997), long-range transport of dust particles (Kellog et al., 2006) and emissions from marine surface waters (Blanchard et al., 1989). Because of long atmospheric residence times (days to weeks) and long-distance transport potential (100's to 1000's km), fine aerosols (Dp< 2 μm) are the usual focus of atmospheric aerosol studies (Seinfeld et al., 2006). Wang et al., 2011, measured the contents of polycyclic aromatic hydrocarbons, polychlorinated biphenyls, organochlorine pesticides, and heavy metals in the surface sediments of biomonitoring sites. Deuker et al., 2011, examined the community composition and local deposition of bacterial aerosols. Lee et al., 2011, briefly reviewed the control methods against bioaerosols and offered suggestions for future research on airborne biological particles.

2.2 National Status:

Bioaerosols are ubiquitous and play an essential role in climate change and have allergenic effects on human health. Mamta et al., 2014, measured and characterized the bioaerosol over Indo-Gangetic plain. They found that meteorological parameters play essential roles in the growth and presence of microorganisms in the air. According to them, the bacterial concentrations are governed mainly by temperature, while fungal concentrations are influenced by relative humidity. Kumar et al., 2004 measured atmospheric concentrations of gaseous SO_2, NO_2, HNO_3, and NH_3 at a suburban and urban site and found that concentrations were higher at the urban site. Adhikari et al., 2006, have reported that in temperate regions, the temperature is probably the most essential meteorological parameter, affecting the spore concentration. Kumar et al., 2007, studied the characteristics of aerosols over the suburban and urban site of the semiarid region in India. They observed the seasonal and spatial variation of aerosol. Singh et al., 2011, investigated the effect of microbial source on size-fractionated concentrations of aerosol.

Ajay et al., 2016, observed significant diversity of fungal spores in the coarse particulate matter. Kumar et al., 2015, measured aerosol and trace gases and meteorological parameters in the winter season at Agra. The average TSPM level is higher than NAAQS values of India, and high wind speed from northwest direction influences the aerosol load.Valsan et al., 2016, quantified the number and mass size distributions and corresponding concentrations of biological aerosol for three distinct focus periods, namely, dusty, high bio, and clean, identified based on the prominent wind direction. Studies related to the bioaerosols are relatively few, and with analysis performed only by traditional techniques (Gangamma, 2011; Srivastava et al., 2011; Pachauri et al., 2013). Therefore it is essential to understand and quantify the impact of bioaerosols on biodiversity with more significant implication for human health and the ecosystem.

2.3 Importance of the proposed project in the context of current status

Indo-Gangetic plain which hosts 40% of the country total population are experiencing drastic change in climate and common public health are suffering from many health related issues like, dengue, chickengunia, monkeygunia, malaria, typhoid, and respiratory and cardiovascular diseases. Increase in the mortality has been associated to the increase in the pollution. Primary biological aerosols are held responsible for deteriorating health status of common public in many urban areas and cities. The allergenic effect of bioaerosols increases in the presence of heavy metals. Hence, investigation on concentration of ambient aerosols and their microbial components are very important. Under twinning activities joint research activities on measurements of aerosol particles (PM_{10}, and $PM_{2.5}$) in Agra, a site over Indo-Gangetic plain, determination of mass concentration, and identification of microbial components in aerosols will be carried out. This twinning activity

will also help in capacity building and start a new research programme on contemporary topics of environmental issues. This study and collaboration will have long term impacts and help in sustainable development.

2.4 If the project is location specific, basis for selection of location be highlighted:

The present study will be carried out in Agra over Indo-Gangetic Basin. Agra hosts a number of monuments including "Taj Mahal" which is famous all over the world and attracts about 30,000 tourists per day. At the same time it is highly polluted as per WHO. But, there are only a few studies on biological air pollution load and limited to culturable components only. Hence, such kind of study is very much required. Agra is located in north-central India. Two third of its peripheral boundaries are bounded by the Thar Desert of Rajasthan and Agra is, therefore, a semi-arid area. The soil type is a mixture of sand and loam, containing an excess of salts. The climate of Agra has been divided into four seasons winter (December to February), summer (March to June), monsoon (July to September) and post-monsoon (October to November). The wind speed in Agra is mostly calm or moderate condition (1-2 m s^{-1}). In Agra, sampling was carried out at Dayalbagh, a local site which is 10 km away from the industrial sector of the city where due to agricultural practices vegetation dominates. The entire samples were collected on the roof of the technical college in the campus of Dayalbagh Educational Institute (Deemed University), Dayalbagh, Agra. The sampling site lies at a distance of 2 km from a national highway (NH-2) which has dense vehicular traffic.

3. Work Plan:

3.1 Methodology:

Sample collection

$PM_{10}/PM_{2.5}$ samples will be collected at Dayalbagh during the study period. $PM_{10}/PM_{2.5}$ will be obtained by using Polltech fine dust sampler. It is a high volume sampler which maintains exact flow rate (16.7 LPM) through the sampler. Glass fiber filter/PTFE will be used for $PM_{2.5}$ sample collection. Air sampler is equipped with the blower motor assembly, filter holder, volumetric flow controller, timer, and an anodized aluminum shelter. It draws precise volumes of air through a filter paper of known weight. The pre-desiccated and pre-weighed sterile filter paper will be mounted on the sampler, and sampling will be performed for 24 hours at a flow rate of 16.67 LPM for $PM_{10}/PM_{2.5}$.

Mass concentration

The total mass of aerosol was determined gravimetrically as follows:

$$Concentration\ (\mu g\ /m^3) = \frac{\text{Mass of filter paper after sampling} - \text{Mass of filter paper before sampling}}{Total\ air\ volume\ (m^3)}$$

Here, the mass of aerosol deposited on the filter paper is the difference in the wt. of filter paper before the sampling and after the sampling, and total air volume (m^3) is the multiplication of flow rate (m^3 / min) and sampling periods (minutes).

Biological characterization of aerosols

The filter of aerosol samples of PM_{10}/$PM_{2.5}$ will be divided into two parts. One half will be cut into small pieces and will be taken into 125 ml conical flask. 25 ml E-pure and sterile water will be poured into flask and samples will be kept on an electrical shaker for 3 hours followed by on ultrasonic bath for 10 minutes. The sample will be filtered through filter paper, and aqueous extract will be used for biological characteristics of aerosol. Culture techniques estimated the presence of bacteria and fungi.

Preparation of culture media

Fungi and bacteria will be cultured using Sabouraud Dextrose Agar (SDA) media and Nutrient Agar Media (NAM), respectively.

Fungal culture

The Sabouraud Dextrose Agar (SDA) will be prepared with the following compositions: Peptone 10 g, dextrose 40 g, Agar 20 g, distilled water 1000 ml, and pH 5.6. To assess the ability of fast growth of aero-fungi, fungi will be incubated at 27°C in the SDA media. The fungal spores will be identified morphologically under a light microscope (Motic BA-310 digital Microscope) using oil immersion at a magnification of 40×. The concentration of fungal spores in the air will be expressed as the number of spores per cubic meter of air (spore m^{-3}). Fungi will be purified by sub-culturing of desirable colonies appearing on SDA plate till pure form is obtained.

Bacterial culture

Bacteria will be isolated using Waksman's dilution technique, and different concentration will be cultured on nutrient Agar medium (beef extract- 1g, yeast extract- 2 g, peptone- 5g, NaCl- 5g, distilled water 1000 ml) and LB media. The incubated plates will be kept at $35^{\circ} \pm 2$°C for one day. As the colony appears on the medium, it will be re-cultured until pure cultures will be obtained. The bacterial spores will be identified morphologically under a light microscope (Motic BA-310 digital) using oil immersion at a magnification of 100×. The concentration of bacterial spores in the air is expressed as the number of spores per cubic meter of air (spores m^{-3}).

Concentration (cfu m^{-3}) = No. of colonies x dilution Factor / Total air volume (m^3)

They will be further identified based on their biochemical characteristics features by Bergey's Manual of Systematic Bacteriology (Claus and Berkely, 1986).

Purification and identification of fungi

Fungi will be purified by sub-culturing of desirable colonies appearing on SDA plate, till pure form will be obtained. For fungal identification, a small portion of fungus colony will be taken on to a slide containing 4% of NaCl. A drop of cotton blue stain will be added over it immediately and will be left for about 1-2 min. The area will be then covered by a cover slip and will be used for the microscopic examination.

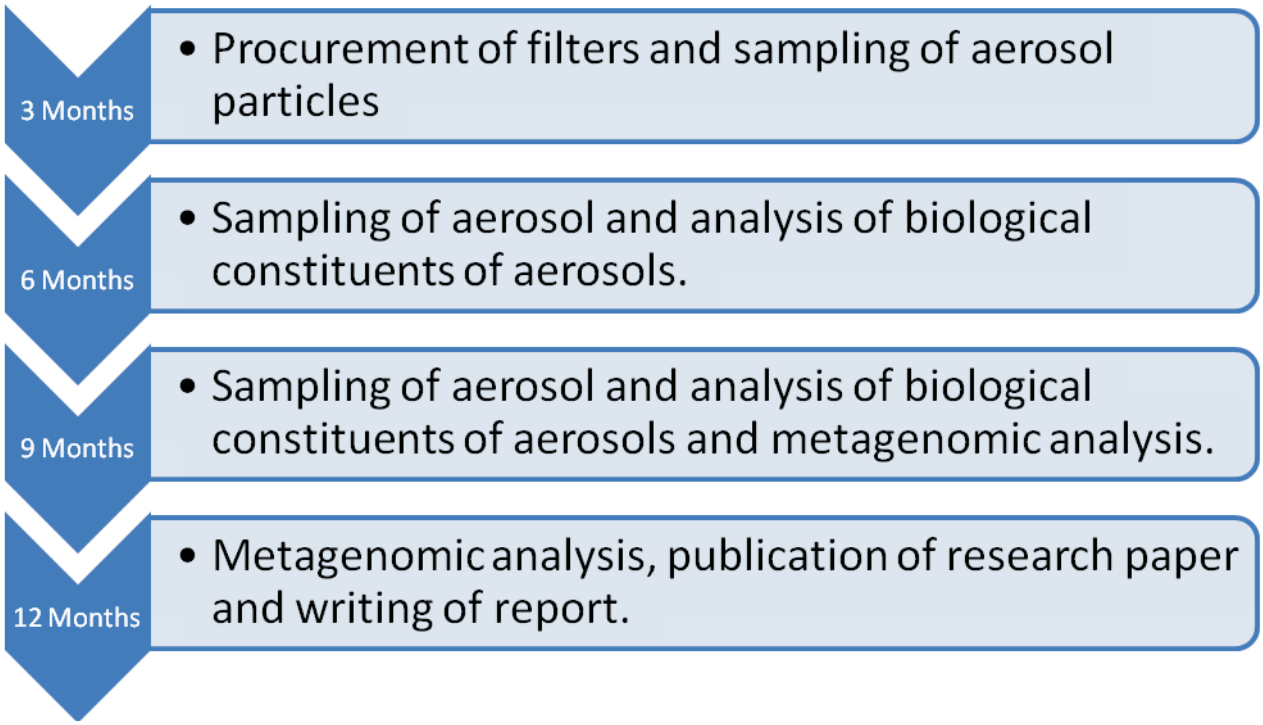
Metagenomic analysis:

Bioaerosol DNA extraction from air filters will be performed by using power soil DNA isolation kit (MO BIOTM soil DNA isolation kit) and processed according to the protocols mentioned in the kit. The extracted DNA will be stored at -20°C until further analysis. DNA samples will be outsouced for IlluminaMi-Seq (2x300 bp) sequencing to Research and Testing Laboratory (RTL) LLC (Lubbock, TX, USA). The raw sequence reads obtained after Illumina paired end sequencing will be processed using MOTHUR software (Schloss 2009). The two sets of data from each sample will be joined to form contigs and further processed to reduce the sequencing and PCR errors. Sequences shorter than 350 nucleotides with homopolymers longer than 8 nucleotides and all reads containing ambiguous base calls or incorrect primer sequences will be removed (Kozich et al. 2013). The improved sequences will be further processed to remove redundant sequences. Next, the processed sequences will be aligned against SILVA v132 database, (Pruesse et al. 2007) available at http://www.mothur.org/wiki/ Alignment database. Putative chimeric sequences will be detected and removed via Chimera Uchime, which is an integrated algorithm in MOTHUR. All taxonomic classification will be performed using Bayesian classifier (Qiong et al. 2007), using a Greengenes dataset (gg_13_8_99) available at https://www.mothur.org/wiki/Greengenes-formatted_databases. Data will be normalized to obtain seven taxonomic levels for each sequence at 80% Naïve Bayesian bootstrap cut-off with 1000 iterations. Operational taxonomic units (OTUs; at 97% and 98% sequence similarity) will be calculated using the Mothur platform. The undesirable sequences belonging to Mitochondria, Chloroplast, Archaea and Eukaryota will be removed. The constructed OTU table will be corrected to comply with current official nomenclature (List of Prokaryotic names with Standing in Nomenclature: LPSN-www.bacterio.net). The rarefaction analysis will be carried out using rarefaction single function of Mothur and alpha diversity will be estimated by calculating the diversity indices like Inverse Simpson, Shannon diversity (H) and Observed richness by sub sampling. The statistical analysis will be carried out using PAST v3.18 (Hammer et al. 2001). The statistical tests like ANOVA and Tukey post-hoc tests will be used to detect remarkable differences in diversity indices between Bioaerosol samples. To further examine the community relationship among all the bioaerosol samples non-metric multi-dimensional scaling (NMDS) by using Bay-Curtis distance. The number of shared OTUs among all the samples will be calculated and represented using a Venn diagram (subsampled OTU table) by Mothur. The distribution of potential pathogenic bacteria/fungi will be deduced from metagenome.

References:

- Schloss PD (2009) A high-throughput DNA sequence aligner for microbial ecology studies. PLoS One 4:e8230.
- Qiong W, George MG, James MT and James RC (2007) Naive Bayesian Classifier for Rapid Assignment of rRNA Sequences into the New Bacterial Taxonomy. Appl Environ Microbiol 73:5261-5267.
- Hammer O, Harper DAT, Ryan PD (2001) PAST: Paleontological statistics software package for education and data analysis. Palaeontologia Electronica 1:9.
- Kozich JJ, Westcott SL, Baxter NT, Highlander SK, Schloss PD (2013) Development of a dual-index sequencing strategy and curation pipeline for analyzing amplicon sequence data on the MiSeqIllumina sequencing platform. Appl Environ Microbiol 17:5112-5120
- Pruesse E, Quast C, Knittel K, Fuchs BM, Ludwig WG, Peplies J, Glöckner FO (2007) SILVA: a comprehensive online resource for quality checked and aligned ribosomal RNA sequence data compatible with ARB. Nucl Acids Res 35:7188-7196.

3.2 Time Schedule of activities giving milestones through BAR diagram.



3.3 Suggested Plan of action for utilization of research outcome expected from the project.

The proposed study will provide detail information about the mass concentration of PM10 and Pm2.5 along with biological components. This study will be first of its kind in which the concentration of culturable and non culturable bacteria and fungi in the aerosol particle would be obtained. Health risk assessment of bioaerosol will give information on the role of bioaerosol in hospital admission and will help in taking control measures. Data obtained can be used for regional health model as well as a regional climate model because bioaerosols are organic in nature.

3.4 Environmental impact assessment and risk analysis.

Health risk assessment analysis will be performed by establishing the relationship between the concentration of bacteria and fungi and hospital admissions. The information on hospital admission will be obtained from OPD of prominent hospital in Agra.

4. Expertise:

4.1 Expertise available with the investigators in executing the project:

Dr. Ranjit Kumar has 16 years of research experience in the area of atmospheric science. His main research area is trace gas and aerosol measurements and characterization; wet deposition and dry deposition chemistry and modeling; black carbon radiative forcing;

bioaerosol, climate change, and public health. He has published more than 39 research papers in National and International journal of repute including one in World 1st ranked Journal in the field of Environmental Engineering and contributed papers in more than 70 seminars/conferences in India and abroad. He has completed and involved in many research projects funded by CSIR, DST (2), ISRO-GBP (2), UGC (2), MHRD (I) as a PI and Co-PI. Dr. Kumar was Visiting Faculty in the Department of Energy, Environment and Chemical Engineering at Washington University in St. Louis, USA. He has visited Germany, Nepal, and the USA. His research has wide recognition as he has received many National and International awards like ISCA Young Scientist Award 2002, NESA Young Scientist Award 2004, AGU START Young Scientist Award 2004, Fast Track Young Scientist Project Award 2004, DST Award for 55th Meeting of Nobel Laureates and Young Scientist at Lindau, 2005, Berkner Fellowship by American Geophysical Union, USA, 2008; UGC Raman Fellowship 2013 etc. He is Fellow of Society of Earth Scientists, Lucknow and Indian Council of Chemists, Agra. He is elected Member of National Academy of Science, India and Member, Core Committee, INYAS, INSA, New Delhi. He is also a member of many scientific societies viz., NESA, New Delhi; IASTA, Mumbai; IAAPC, Baroda, SSI, Trivandrum; ISCA, Kolkata; COSPAR (Committee on Space Research), USA; Affiliate Member, IUPAC; USA, etc. Recently he has been bestowed with Member, INYAS (Indian National Young Academy of Sciences), INSA, New Delhi in 2017. He was member Core Committee of INYAS.

Dr. Ashok Yadav is Associate Professor in the Department of Mecanical Engineering, Faculty of Engineering, Dayalbagh Educational Institute (Deemed University), Dayalbagh, Agra. He has wide experience of teaching and research in the field of environmental sustainability.

Prof. Ch. Sasikala received an M.Sc. degree in Applied Microbiology from the Bharatiar University, Coimbatore and (1986) and a Ph.D. in Microbiology from Osmania university, Hyderabad (1990). After a post-doctoral period at the same University, she joined JNT University Hyderabad in 1996, where she started her own lab. She is currently a professor of Environmental science and technology at the Centre for Environment, IST, JNT University Hyderabad, India. She is also presently the Chairperson of Board of studies. Dr. Sasikala's research interests are in the area of bacterial diversity, metabolomics and bioprospecting for environmental management and in biotechnology, specifically with respect to anaerobic bacteria. Genetic diversity studies through metagenome analysis have enabled guest mates of bacterial diversity while cultured diversity studies have resulted in the valid description (i.e., publication in International Journal of Systematic and Evolutionary Microbiology) of over 130 new species, 14 new genera, 1 new family and 1 new order in addition to several reclassifications. She is elected as a member of "International Committee on systematic of prokaryotes: Subcommittee on the taxonomy of phototrophic bacteria". She is recipient of State award for Meritorious teachers-2016 by Government of Telangana and Prof. B.N. Johri award for microbial diversity of Association of Microbiologists of India in 2016.

4.2 Summary of roles/responsibilities for all Investigators:

S.No.	Name of the Investigators	Roles/Responsibilities
1.	Dr. Ranjit Kumar (DEI)	Co-Principal Investigator (Will be involved in analysis of biological constituents of aerosols and interpretation of results)
2.	Dr. Ashok Yadav (DEI)	Principal Investigator (Will look after sampling and logistics)
2.	Dr. Ch. Sasikala (JNTUH)	Principal Investigator (Will be involved in metagenomic analysis of aerosols and interpretation of findings)

4.3 Key publications published by the Investigators pertaining to the theme of the proposal during the last 5 years

Publication of PI

- **Ranjit Kumar** and K. Maharaj Kumari. Measurement of near ultrafine S aerosol at a semiarid region in India. National Academy Science Letter 35(3), 177–180, 2012.

- **Ranjit Kumar**, S.S. Srivastava and K. Maharaj Kumari. Experimental and parameterization method for evaluation of dry deposition of acidifying S compounds to natural surfaces (*Cassiasiamea*). Atmospheric and Climate Sciences 2 (4), 492-500, 2012.

- **Ranjit Kumar**, J.N. Srivastava, G.P. Satsangi, Mamta and K. Maharaj Kumari. Biaerosol: A new research perspective in Climate change. Earth Science India, 2013 (Accepted).

- Nupur Raghav, J.N. Srivastava, G.P. Satsangi and **Ranjit Kumar**. Investigation on abundance of microbial communities in ambient air over urban site in semi-arid region. Journal of Energy Research and Environmental Technology 2 (5), 375-378, 2015.

- **Ranjit Kumar**, Sudhir Kumar Verma and K. Maharaj Kumari. Chemical characterization of depositing materials onto building surfaces. Proceedings of National Conference on Recent Advances in Chemical and Materials Sciences, 124- 128, 2015.

- Mamta, J.N. Srivastava, G.P. Satsangi and **Ranjit Kumar**. Assessment of bioaerosol pollution over Indo-Gangetic plain. Environmental Science and Pollution Research 22 (8), 6004-6009, 2015.

- **Ranjit Kumar** and K. Maharaj Kumari. Characterization of aerosols and trace gases in Indo- Gangetic plain. Urban Climate 12, 11-20, 2015.

- **Ranjit Kumar** and K. Maharaj Kumari. Evaluation of dry deposition of acidifying N compounds to vegetation. Environmental Science and Pollution Research 22(23), 18437-18445, 2015.

- P. Gupta, S. P., Singh, A. Jangid and **Ranjit Kumar**. Estimation of physical and optical properties over Indo-Gangetic basin in India. Session. Proceeding of IASTA Bulletin 22(1 & 2), 495-497, 2016, ISSN 09714510.

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- Rohini Singh, Pratima Gupta, Ashok Jangid, Anshumala Sharma, Ranjit Kumar, 2018. A one year study on assessment of fractionated aerosol at a semiarid region over Indo-Gangetic basin. Clean, Soil, Air and Water. doi.org/10.1002/clen.201800040.

- Pratima Gupta, Ashok Jangid and **Ranjit Kumar**, 2018. Measurement of PM_{10}, $PM_{2.5}$ and Black Carbon and assessment of their health effects in Agra, a semiarid region of India. Proceeding of the Indian National Science Academy. (Accepted).

- Pratima Gupta, Ashok Jangid, Sahab Das and **Ranjit Kumar**. Speciation of carbon soot particle and source interpretation. Journal of Geophysical Research, 2018 (Under review).

Chapter in book

- Ranjit Kumar and Pratima Gupta. A chapter on “Air Pollution control policies and regulations” in a book entitled “Air Pollution and Plant Health: Climate Change Perspectives" (Editors: Prof. UC Kulshrestha and Dr. Pallavi Saxena), Chapter 12, Springer, page no. 133-149, 2016.

- Ranjit Kumar, Vineeta Deewakar, J.N. Srivastava and K. Maharaj Kumari. Biochemical characteristics of aerosol at a sub urban site. “Chemistry of Phytopotentials: Health Energy and Environmental Perspectives” (editors - M.M. Srivastava, L.D. Khemani and S. Srivastava). DOI: 10.1007/978-3-642-23394-4_79, Springer-Verlag Berlin Heidelberg, page 373-375, 2011.

Publication of Ch. Sasikala in the last 5 years (78)
Important publications in the proposed research area are given below.

- Kumar Gaurav; Dhanesh kumar; Jagadeeshwari Uppadda; **Sasikala Ch**; Ramana Ch, V.(2019) Metagenomic insights into the not-yet-cultivated diversity of Planctomycetes of Chilika lagoon and descriptions of exospore producing *Roseiconus lacunae* gen. nov. sp. nov., *Pararoseiconus nitratireducens* gen. nov. sp. nov. Systematic and applied microbiology (communicated)

- Kumar Gaurav; Radha Vaddavalli; Jagadeeshwari Uppada; **Sasikala Ch;** Ramana Ch, V. (2019) Sponge-associated Planctomycetes" Brazilian Journal of Microbiology (Communicated)

- G Suresh; Dhanesh Kumar; Krishna A; **Sasikala Ch**; Ramana Ch.V., Ph.D (2019) *Rhodobacter sediminicola* sp. nov., isolated from a fresh water pond of Gujarat Int. J. Syst. Evol. Microbiol. (Accepted Ms No. IJSEM-D-19-00586)

- Suresh, Tushar, **Sasikala, Ch** and Ramana, Ch. V. (2019) Taxogenomics resolved the conflict of the genus *Rhodobacter*: A two and half decades pending thought to reclassify the genus R*hodobacter*. Frontiers in Science Research Integrity (accepted)

- Suresh, Dhanesh Kumar, Jagadeeshwari Uppada, **Sasikala Ch**, Ch V Ramana (2019) *Rhodomicrobium lacus* sp. nov., an alkalitolerent bacterium isolated from Umiam lake, Shillong, India Int. J. Syst. Evol. Microbiol (Accepted Ms. No. IJSEM-D-19-00001R1)

- Anusha Rai, Indu, N. Smita, G. Deepshikha, K. Gaurav, K. Dhanesh, G. Suresh, Ch. **Sasikala**, and Ch. V. Ramana (2019) Emerging Concepts in Bacterial Taxonomy Microbial Diversity in Ecosystem Sustainability and Biotechnological Applications Book Subtitle Volume 1. Microbial Diversity in Normal & Extreme Environments ISBN:978-981-13-8314-4 **(Chapter in book)**

- T. S. Sasi Jyothsna; K. Rahul; Saikat Dutta; **Ch. Sasikala** and Ch.V. Ramana (2019) Phylogenetic Diversity of Sulfate Reducing Bacteria of Sediments of Chilika Lake, India, determined through analysis of the Dissimilatory Sulfite Reductase (dsr AB) genes 3Biotech 9:134- 139

5. List of Projects submitted/implemented by the Investigators:

5.1 Details of Projects submitted to various funding agencies: NA

S. No	Title	Cost in Lakh	Month of submission	Role as PI/Co-PI	Agency	Status

5.2 Details of Projects under implementation

S. No	Title	Cost in Lakh	Duration	Role as PI/Co-PI	Agency
Dr. Ranjit Kumar					
1.	Characterization of physical and optical properties of aerosol at Agra in Indo-Gangetic plain	71.0	2013-18	PI	ISRO-GBP
Dr. Ch Sasikala					
2.	Biodegradation of Pharmaceuticals and Personal Care Products (PPCPs): PPCP degrading bacterial diversity and their potential application in the wastewater treatment	10.0	2018- 2020	PI	UGC (midcareer award grant)
3.	Anoxygenic phototrophic bacterial diversity of marine habitats of India	2.0	2018-2019	PI	TEQIP
4.	Carbon sequestration using anoxygenic photo autotrphic bacteria: Potential exploitation for Climate Change Mitigation	10.0	2019-2021	PI	AICTE (Research Promotion Scheme)
5.	Studies on Microbial ecology, diversity and their Bioprospecting for Environmental Management	10.0	2019-2021	PI	AICTE (MODROBS)

5.3 Details of Projects completed during the last 5years

S. No	Title	Cost in Lakh	Duration	Role as PI/Co-PI	Agency
Dr. Ranjit Kumar					
1.	A study on bioaerosols in TSPM, PM_{10} and $PM_{2.5}$ at a suburban site	20.50	2012-15	PI	DST
2.	A study on biochemical characteristics of aerosols at an urban site of Indo-Gangetic plain	11.45	2012-15	PI	UGC
Dr. Ch Sasikala					
3.	Marine anaerobic bacteria diversity for the production of antimicrobials	40.00	2013-2017	PI	MoES
4.	Bacterial hopanoids as chemotaxonomic markers: A study on the genus *Rhodovulum*	2.0	2015-2017	PI	TEQIP
5.	Petroleum hydrocarbon (PTH) degrading bacterial diversity and their potential application in bioremediation of petroleum contaminated sites	2.0	2015-2017	PI	TEQIP
6.	Ecology of Halo-Anoxygenic phototrophic bacteria of marine habitats of Gujarat	47.05	2014-2018	PI	MoES

6. List of facilities being extended by parent institution(s) for the project implementation.

a. Infrastructural Facilities

Sr. No.	Infrastructural Facility	Yes/No/ Not required Full or sharing basis
1.	Workshop Facility	Yes
2.	Water & Electricity	Yes
3.	Laboratory Space/ Furniture	Yes
4.	Power Generator	Yes
5.	AC Room or AC	Yes
6.	Telecommunication including e-mail & fax	Yes
7.	Transportation	Yes
8.	Administrative/ Secretarial support	Yes
9.	Information facilities like Internet/Library	Yes
10.	Computational facilities	Yes
11.	Animal/Glass House	Not Required
12.	Any other special facility being provided	-

b. Equipment available with the Institute/ Group/ Department/Other Institutes for the project:

Equipment available with	Generic Name of Equipment	Model, Make & year of purchase	Remarks including accessories available and current usage of equipment
PI & his group (DEI)	1.PM_{10} Sampler 2. $PM_{2.5}$ Sampler 3. PM_1 Sampler 4. Trace gas measurements unit 5. CO_2 Analyzer 6. Spectrophotometer 7.Aethalometer 8. Multi-wavelength Radiometer 9. Pyranometer 10. Automatic AWS10.0 (Rave Innovations) Weather Station 11. Microscope 12. Ultrasonic bath 13. Laminar flow 14.BOD Incubator	Envirotech/Polltech Polltech Instruments Envirotech Envirotech Rave Innovations Systronics M&G Analyzer SPL Delta Ohm Rave Innovations Motic Sarthak Scientific Zenith Zenith	

	15. Autoclave 16.Microwave oven	Zenith LG	
PI's Department	17. E-pure Deioniser 18. Ion Chromatograph	Barnstead/Thermolyne Dionex Dx-500 anion columns (AS11A) Self regenerating.	
Principal Investigator (IST- JNTUH)	PCR PCR GC DGGE Spectroflourimeter Microplate reader Gel Documentation Micropipette Bacteriological incubator Incubator shaker Laminar Air Flow Chambers UV Spectrophotometer Phase contrast microscope Phase Contrast microscope FT IR HPLC	BIO-RAD Eppendorf Shimadzu 14B Bio-rad Perkin Ekmer (LS45) Epoch Biotech Bio-Rad (Gel Doc EZ) Pipetteman Cintex Heidolph Shimadzu UV-1800 Olympus BX 40 Leica Perkin Elmer Shimadzu Shimadzu LC-20AD	All the instruments ae in good working condition and under use.

7. **Name and address of experts/ institution interested in the subject / outcome of the project.** Central Pollution Control Board, State pollution control Board, Ministry of Environment, Forest and Climate change. Researchers in the area of air pollution research, doctors, pulmonologists and epidemiologists.

PROGRAM BUDGET

	Particulars	Amount		Total
		DEI	JNTUH	
Travel	Transportation charges Students/Researcher/Teacher (@ 12,000.00 per person per visit for teacher (two visits) @ 10,000.00 per person per visit for student (two visits))	50,000.00	Nil	88,000.00
	Lodging, meals and incidental expenses for **Collaborator** Students/Researcher/Teacher	15,000.00 (for 3 days @ each visit)	Nil	18,000.00
Consumables	Consumables/Chemicals/Filters etc	1,35,000.00	20,000.00	1,24,000.00
Outsourcing	Outsourcing for metagenome sequencing (for 40 samples, either for 16 S r RNA amplicon sequencing or shotgun sequencing or metagenome assembled genome sequencing through metagenome binning)	0.00	1,80,000.00	1,80,000.00
	Total	**2,00,000.00**	**2,00,000.00**	**4,00,000.00**

PARTICIPANT STATISTICS

Proposal for a Partnership between: Dayalbagh Educational Institute, Agra & J.N.T.U, Hyderabad under twinning activities of TEQIP

Anticipated Number of D.E.I. Participants in Exchange Visit:

Males: **02**

Females: **02**

Participants' Occupations: **Teaching**

Teachers/Faculty: **02**

Researchers: **01**

Graduate Students: **01**

Other (please specify):

Anticipated Number of J.N.T.U.H. Participants in Exchange Visits:

Males: **Nil**

Females: **02**

Participants' Occupations: **Teaching and Research**

Teachers/Faculty: **01**

Researchers: **01**

Graduate Students: Nil

Other (please specify):

Include the total duration of all exchange visits: **For the entire grant period (20018-2019), give the total number of days/weeks:**
D.E.I. Participants: **10** days
J.N.T.U. Participants: **06** days

*Signature with seal:

Principal Investigator (DEI)

Co-Principal Investigator (DEI)

Head of the Department

Dean, Faculty of Engineering &
Member BOG, TEQIP

DEAN
Faculty of Engineering
Dayalbagh Educational Institute

Principal Investigator (JNTUH)

Head of the Department
(CEN)

Director
(IST, JNTUH)

HEAD
Centre for Environment,
Institute of Science & Technology
JNT University Hyderabad
Hyderabad-500 085, T.S

DIRECTOR
JNTH Institute of Science & Technology
Kukatpally, Hyderabad-85.

* Document with original signatures is being brought by DEI representative to the meeting of BOG on 26/10/2019. This is a printout of scanned document.

ANNEXURE 4-2

Name of the Institute	**Dayalbagh Educational Institute**		
Address	Mechanical Engineering Department, Faculty of Engineering, Dayalbagh Educational Institute (Deemed University), Dayalbagh, Agra 282005 (UP)		
Contact details	ashokyadavaca@gmail.com	0562-2801226	9412893447
Permanent Id of the Institute	1-482451854		
Department	Mechanical Engineering Department		
Strength & Weakness of the Institute	**Strength: Institute graded "A+" by NAAC**, Excellent Academic Work, Innovative Educational Programmes, Campus completely Powered by 520 kWp Solar Power Plant, All hostels using Solar Thermal Cooking, Several MHRD MCIET programmes worth Rs. 40 crores are running, Several AICTE R&D and MODROB projects completed, Institute has an innovative Vision 2031 to bring Institute among top 20 Institutes of the country. Weakness: Industry based research		

Technical Field of proposal

Ground water recharge

Title of proposal

Development of direct sub-surface water recharge system for enhancement of water table

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Abstract

Water is the essence of life and for human need most of it is being extracted from the underground water. Hence water table is fast depleting. Seriousness of the problem can be visualized with the fact that the water table at 80 feet in 2008 has gone down to 150 feet 2018 and continuously declining. The traditional way of rainwater harvesting is a slow process,

dependent on infiltrate rate of the soil at that place and hence unable to infiltrate all the runoff water. So, there is an urgent need to device a mechanism to replenish the ground water.

In the present work, direct sub-surface water recharge system will be developed in Faculty of Engineering buildings. There is lot of roof surface area of the building from where clean rainwater will be collected at suitable points on the ground and artificial aquifer recharge systems will be developed at these points for direct sub-surface recharge of the water table.

Keywords: direct sub-surface recharge, artificial recharge, aquifer, rainwater harvesting, rainfall.

Objective - Project Significance / Relevance with ongoing academic activities

1) To evaluate various aquifer recharge technologies available in the market.
2) To carry out technical feasibility of direct injection well for aquifer recharging.
3) To design and develop an artificial aquifer recharge system through injection well.
4) To carry out the economic analysis of the system.

Project Impact -Expected outcome

There is a fast depletion of water table in Agra region as a result of which inferior quality and low quantity of water is available to the general public. Due to the fast expansion of residential area in and around Dayalbagh, there is ever increasing demand for ground water. Seriousness of the problem can be visualized with the fact that the water table at 80 feet in 2008 has gone down to 150 feet 2018 and continuously declining. The traditional way of rainwater harvesting is a slow process, dependent on infiltrate rate of the soil at that place and hence unable to infiltrate all the runoff water. So, there is an urgent need to device a mechanism to replenish the ground water.

Methodology:

Initially, assessment of site will be carried out based on suitability of drilling the injection well. This will include the assessing the buildings area where plenty of rainfall water may be collected. Number of injection wells will be drilled based on the rainfall. Finally, a water chamber will be prepared for filtering the rainwater.

ANNEXURE 4-2

Budget Estimates – Consumable

Proposed equipment/s	Specifications	No of units	Cost in Rs.
PVC Pipe	4' diameter, Standard specification	50	70,000
Masonary work (Cement, chambal sand, brick etc)	4 -6 concrete tanks, covers, channels etc	-	20,000

Add rows as required

Budget Estimates –Installation/service

Boring well	Rs 50,000
Masonary Labour	Rs 50,000

Add rows as required

Testing Charges

Testing charges	Rs. 10,000

Total Estimated Cost

Rs 2,00,000/- (Two Lacs only)

Details of Project Coordinator

Name	DR ASHOK YADAV		
Exact designation	Assistant Professor	Date of joining	21/07/2011
Appointment Type	Regular	Scale of	15600-39100

ANNEXURE 4-2

		Appointment (payband)	
Department	Department of Mechanical Engineering		
Qualifications	UG (B.Sc. Engineering, Mechanical Engg.)	PG (M.Tech., Engineering Systems)	PhD (Biofuels)
Experience in years	Teaching (20 years)	Industry (Nil)	Research (14 years)
Students guided	UG (12batches x4)	PG (8)	PhD (1)
Publications	National (1 jounals + 15 conferences)	International (6 journals + 9 conferences)	Books (NIL)
Relevant experience	worked on biodiesels during PhD Research, worked on renewable energy like solar energy for thermal modeling of solar assisted cooking system and evacuated tube water heaters, worked for energy extraction from petha waste.		
Other information	As crop residues as fuel are already being used by kiln owners, this becomes very essential to establish the facts that these alternate fuels are promising fuels for kilns. No study on these fuels for brick kilns is so far done.		
Cell number	9412893447		
Email	ashokyadavaca@gmail.com		
Signature			

ANNEXURE 4-1

Name of the Institute	**Dayalbagh Educational Institute**		
Address	Mechanical Engineering Department, Faculty of Engineering, Dayalbagh Educational Institute (Deemed University), Dayalbagh, Agra 282005 (UP)		
Contact details	vsoamidas@dei.ac.in	0562-2801226	8433019794
Permanent Id of the Institute	1-482451854		
Department	Mechanical Engineering Department		
Strength & Weakness of the Institute	**Strength: Institute graded "A+" by NAAC**, Excellent Academic Work, Innovative Educational Programmes, Campus completely Powered by 520 kWp Solar Power Plant, All hostels using Solar Thermal Cooking, Several MHRD MCIET programmes worth Rs. 40 crores are running, Several AICTE R&D and MODROB projects completed, Institute has an innovative Vision 2031 to bring Institute among top 20 Institutes of the country. Weakness: Industry based research		

Technical Field of proposal

Water filtration

Title of proposal

River Bank Filtration

Abstract

Water is the essence of life and for human need most of it is being extracted from the underground water. Riverbank filtration is one of the techniques used to filter the water for potable use. A Riverbank Filtration project has recently been set up by DEI with the support of DST near the Yamuna river in Dayalbagh, Agra. One aspect of such a project is establishing that

the water being drawn from the borewells is actually surface water from the river that has seeped through its banks and is not sourced from underground water aquifers.

For an accurate analysis it is required that several borewells be drilled at varying distances from the riverbank. At each borewell location, water has to be drawn from the underground water source closest to the surface and analysed for the presence of various chemicals.

In the present work, a comparison of the results of these analyses would give an idea of the content of river water in the water being drawn at any of the locations where wells have been drilled.

Keywords: river bank filtration

Objective - Project Significance / Relevance with ongoing academic activities

1) To establish the fact that the water obtained is not underground water.
2) To carry out chemical analysis of the samples of water obtained from ground and riverbank.
3) To achieve the desired parameters of filtered water for potability.

Project Impact -Expected outcome

A Riverbank Filtration project has recently been set up by DEI with the support of DST near the Yamuna river in Dayalbagh, Agra. One aspect of such a project is proving that the water being drawn from the borewells is actually surface water from the river that has seeped through its banks and is not sourced from underground water aquifers.
The tests performed during the project duration were not conclusive. For an accurate analysis it is required that several borewells be drilled at varying distances from the riverbank. At each borewell location, water has to be drawn from the underground water source closest to the surface and analysed for the presence of various chemicals.

Methodology:

A comparison of the results of analyses of water samples drawn from wells at varying distances from the river would give an idea of the content of river water in the water being drawn.

An accurate result would be forthcoming if several borewells are drilled at varying distances from the riverbank. At each borewell location, water drawn from the underground water source closest to the surface would be analysed for the presence of various chemicals.

ANNEXURE 4-1

Budget Estimates –
Installations/Consumable/service

Proposed work	Specifications	No of units	Cost in Rs.
Drilling of borewells	4' diameter bore up to depth of water table,	10	1,00,000
Analysis of water samples		-	1,00,000

Total Estimated Cost

Rs 2,00,000/- (Two Lakhs only)

Details of Project Coordinator

Name	PROF. V. SOAMIDAS		
Exact designation	Professor	Date of joining	1994
Appointment Type	Regular	Scale of Appointment (payband)	
Department	Department of Mechanical Engineering		
Qualifications	UG (B.Tech., Mechanical Engg.)	PG (M.Tech., Machine Dynamics)	PhD (Analysis of Fiber reinforced composite annular disks)
Experience in years	Teaching (29 years)	Industry (Nil)	Research (35 years)

ANNEXURE 4-1

Students guided	UG (25 batches)	PG (3)	PhD (1)
Publications	National (1 journals + 5 conferences)	International (11 journals + 2 conferences)	Books (NIL)
Relevant experience	Worked on river bank filtration in recently completed DST Project		
Other information	The proposed work complements the recently completed DST project		
Cell number	8433019794 / 9258771514		
Email	vsoamidas@dei.ac.in		
Signature			

The proposal had been presented in the BoG Meeting on 30-11-2019, where it was advised that opinion of some experts may be obtained regarding the suitability of the method suggested for the purpose envisaged. Accordingly, the problem only (without specifying the method of solution) was posed to an online group working on water and this method came up as one of the solutions. Further, the problem was also submitted to Dr Suresh, from the Central Ground Water Board, Faridabad, who also approved of the suggested method.

In view of the above, the proposal is being submitted again with revision in the financial requirements.