# Number of departments with UGC-SAP, CAS, DST-FIST, DBT, ICSSR and other recognitions

# 2021-2022


Maharaja Ganga Singh University

A State University of Higher Education for Dignity and Self-Reliance

Approved by UGC under Section 12B of the UGC Act 1956

NH 15, Jaisalmer Road, Bikaner-334004 (Rajasthan), India

https://mgsubikaner.ac.in

**INDIAN INSTITUTE OF TECHNOLOGY DELHI**
**Department of Civil Engineering**
**Hauz khas, New Delhi-110016**

**Dr. Gazala Habib**
**Associate Professor**

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October 31, 2018

To,
Prof. A. K. Chhangani (Project Investigator)
Department of Environmental Sciences
Maharaja Ganga Singh University
NH-15, Jaisalmer Road
Bikaner-334004, Rajasthan

**Subject:** MOU for air quality monitoring at Maharaja Ganga Singh University under National Carbonaceous Aerosol Program-CarbOnaceous AerosoL Emissions, Source apportionment & Climate Effects (NCAP-COALESCE).

Respected Prof. Chhangani,

As per our discussion and meeting with honorable vice chancellor, registrar and finance officer on 29/10/2013 at Maharaja Ganga Singh University, Bikaner, the air pollution monitoring activity at your institute under NCAP-COALESCE project funded by Ministry of Environment and Forest-Climate Change will start soon. This activity at MGSU under academic collaboration with IIT Delhi will benefit your institute in following aspects.

1. Training of man power for measurement of emissions from various sources including biomass fuel in cooking stoves, open biomass burning after harvest, brick kiln and vehicles using a custom build source sampling train developed by IIT Delhi and IIT Bombay.
2. Training of man power for Super SASS 8-channel aerosol collection sampler with denuder.
3. Participation of students in survey related to residential sector, agricultural sector, brick kiln and vehicles using digital application provided by IIT Bombay.
4. Enabling Msc/MTech theses of students of MGSU (co-guided by Prof. A. K. Chhangani & Prof. Gazala Habib), exploiting the field survey and sampling data, along with additional analysis using meteorology/ trajectory/ source apportionment/ other models.
5. TA/DA of one student visiting any collaborative institutes for training will be paid from 'Travel head' of the NCAP-COALESCE project at IIT Delhi.
6. TA/DA of PI (Prof. A. K. Chhangani) for attending review meetings will be paid from 'Travel head' of the NCAP-COALESCE project at IIT Delhi.
7. The infrastructure and consumable for conducting the measurement at MGSU will be supported by IIT Delhi.
8. The authorship on publication/publications will be decided as per NCAP policy document approved to MOEF-CC.

A technical staff appointed by IIT Delhi will be responsible for operation and maintenance of instruments. The accommodation of technical staff in guesthouse/hostel will be provided by MGSU. The electricity for running the instrument will be provided by MGSU. The instruments including SASS sampler, aethalometer, nephelometer etc. will be loaned to MGSU and will remain the property of IIT Delhi.

Looking forward to your support,

Thanking you,

*Yours Sincerely,*

***Prof. Gazala Habib***
***(PI: IIT Delhi)***

**Prof. A. K. Chhangani**
**(PI: MGSU) BIKANER**
Professor & Head
Department of Environmental Science
Maharaja Ganga Singh University
Bikaner

Sanction No.:14/10/2014-CC (Vol. II)

Total cost of the project: 67.16 Cr

Duration: 7 Years

Start date of the project: 01.04.2016

Closing date of the project: 31.03.2023

**Key objectives and specific scientific problems of NCAP-COALESCE:**

The NCAP-COALESCE is a multi-institutional project envisaged to **understanding scientific complexities related to carbonaceous aerosols, focussing on issues underlying their origin and fate, and their role as drivers of regional climate change over India**

| Key objectives | Specific scientific problems |
|---|---|
| 1.Reduce current uncertainty in the magnitude and sectoral distribution of carbonaceous aerosols (and co-pollutant) emissions over India. | a) Measurement of field emission factors of carbonaceous aerosol fractions (BC, OC and BrC), speciated $PM_{2.5}$ and selected co-emitted gases from major sources of regional importance (i.e., residential cooking, space heating, water heating and lighting, brick kilns, on-road diesel transport, and agricultural residue burning). |
| | b) Understanding the influence of technology, operating practice and fuel properties on microphysical, chemical and optical properties of aerosol emissions under field conditions. |
| | c) Identification of sources which emit the darkest (net warming) particles, through measurement of spectral mass absorption and scattering cross-section and microphysical properties. |
| | d) Estimation of activity rates in the use of different fuels, technologies, and practices in key carbonaceous aerosol emitting sectors over India. |
| | e) Development of a gridded carbonaceous aerosol emission inventory for India, with improved sectoral methodologies from ground-truthing and validation with field survey data. |
| 2.Identify and quantify sources influencing abundance and properties (chemical and optical) of anthropogenic aerosols and carbonaceous constituents over India. | a) Seasonal and spatial variation in aerosol chemical composition and optical properties at eleven regionally representative sites across India. |
| | b) Quantitative source apportionment of $PM_{2.5}$ and carbonaceous aerosols and identification of sources and geographical regions influencing high pollution episodes. |
| | c) Distinguishing similar sources of carbonaceous aerosol emissions using chemical fingerprinting (organic markers, thermally resolved carbon fractions and C-isotopes). |
| | d) Source apportionment of aerosol optical properties and resolution of primary versus secondary sources of aerosols using multi-linear extended models. |
| | e) To quantify source-sector influence on $PM_{2.5}$ and carbonaceous aerosol abundance, through quantitative comparison of RCM predictions with PMF receptor modelling by season and region. |
| 3.Estimate the impact of aerosols (anthropogenic and carbonaceous) on regional climate variables, along with climate feedback on air-quality. | a) Multi-model ensemble simulations, with RCMs and GCMs, for evaluation of model diversity in annual and seasonal anthropogenic aerosol variables and aerosol processes, including mass and species concentrations, sulphate formation ($SO_2/SO_4$ ratios), dry and wet deposition, total and species AOD, SSA, asymmetry parameter and radiative forcing. |
| | b) Estimating aerosol radiative forcing over India and the contribution of carbonaceous aerosols, resolved by source, season and region. |
| | c) Estimating the response of South Asian monsoon precipitation response to radiative forcing of aerosol direct, indirect and total effects. |
| | d) Special hypotheses including:<br>- Sensitivity of radiative forcing to changes in emissions, mixing state and aerosol optical properties (mass absorption cross-section);<br>- Carbonaceous aerosol influence on temperature response and frequency of high temperature extremes;<br>- Influence of anthropogenic aerosols on circulation patterns and cloud microphysics;<br>- Trends in aerosol deposition and radiative forcing, temperature and snow cover in the Himalaya. |
| 4. Evaluating secondary aerosol formation, improving organic aerosol source resolution (impacts on air quality) and estimating brown carbon absorption (impacts on climate). | a) Evaluation of secondary inorganic and organic aerosol (SIA and SOA) formation. |
| | b) Identification of Organic Aerosol (OA) and Brown Carbon (BrC) tracers for input to PMF modelling organic aerosol sources. |

# List of Principal Investigators / Co- Investigators

| S. No. | Name | Designation | Institution |
|---|---|---|---|
| **Lead Institution** | | | |
| 1 | **Dr. Chandra Venkataraman** | **National Coordinator & Principal Investigator** | IIT Bombay |
| 2 | Dr. Mani Bhushan | co-Investigator | |
| 3 | Dr. Harish Phulerla | co-Investigator | |
| 4 | Dr. Subimal Ghosh | co-Investigator | |
| 5 | Dr. Abhishek Chakraborty | co-Investigator | |
| 6 | Dr. Manoranjan Sahu | co-Investigator | |
| **Associate Institutions** | | | |
| 7 | **Dr. Tarun Gupta** | **Principal Investigator** | IIT Kanpur |
| 8 | Dr. Debajyoti Paul | co-Investigator | |
| 9 | Dr. Anubha Goel | co-Investigator | |
| 10 | **Dr. Gazala Habib** | **Principal Investigator** | IIT Delhi |
| 11 | Dr. Dash S K | co-Investigator | |
| 12 | Dr. Sagnik Dey | co-Investigator | |
| 13 | Dr. Dilip Ganguly | co-Investigator | |
| 14 | **Dr. Ramya Sunder Raman** | **Principal Investigator** | IISER Bhopal |
| 15 | **Dr. Ravi Krishna R** | **Principal Investigator** | IIT Madras |
| 16 | Dr. Shiva Nagendra S M | co-Investigator | |
| 17 | Dr. Sachin Gunthe | co-Investigator | |
| 18 | **Dr. Shubha Verma** | **Principal Investigator** | IIT Kharagpur |
| 19 | **Dr. Sajani S** | **Principal Investigator** | CSIR-4PI Bangalore |
| 20 | **Dr. Ramachandran S** | **Principal Investigator** | PRL Ahmedabad |
| 21 | Dr. Harish Gadhavi | co-Investigator | |
| 22 | **Dr. Amit Kesarkar** | **Principal Investigator** | NARL Gadanki |
| 23 | Dr. Vikas Singh | co-Investigator | |
| 24 | **Dr. Tuhin Mandal** | **Principal Investigator** | CSIR-NPL Delhi |
| 25 | Dr. Sudhir Kumar Sharma | co-Investigator | |
| 26 | Dr. Sharma C | co-Investigator | |
| 27 | Dr. Singh S | co-Investigator | |
| 28 | **Dr. Anand S** | **Principal Investigator** | BARC Mumbai |
| 29 | Mr. Tanmay Sarkar | co-Investigator | |
| 30 | **Dr. Rohini Bhawar** | **Principal Investigator** | University of Pune |
| **Field Institutions** | | | |
| 31 | **Dr. Baerbel Sinha** | **Principal Investigator** | IISER Mohali |
| 32 | **Dr. Naresh Kumar R** | **Principal Investigator** | BIT Mesra |
| 33 | Dr. Jawed Iqbal | co-Investigator | |
| 34 | **Dr. Abhijit Chatterjee** | **Principal Investigator** | Bose Institute Kolkata |
| 35 | Dr. Sanjay Ghosh | co-Investigator | |
| 36 | Dr. Sibaji Raha | co-Investigator | |
| 37 | **Dr. Arshid Jehangir** | **Principal Investigator** | University of Kashmir |
| 38 | **Dr. Asif Qureshi** | **Principal Investigator** | IIT Hyderabad |
| 39 | **Dr. Pandithurai G** | **Principal Investigator** | IITM Pune |
| 40 | **Dr. Binoy Saikia** | **Principal Investigator** | CSIR-NEIST Jorhat |
| 41 | Dr. Prasenjit Saikia | co-Investigator | |
| 42 | **Dr. Jitender Singh Laura** | **Principal Investigator** | MDU Rohtak |
| 43 | **Dr. Anil Kumar Chhangani** | **Principal Investigator** | MGSU Bikaner |
| 44 | **Dr. Sadashiva Murthy** | **Principal Investigator** | SJCE Mysuru |
| 45 | Dr. Udhayashankara T H | co-Investigator | |


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# MEMORANDUM OF UNDERSTANDING

The Memorandum of Understandings (herein referred to as MOU) is made between

Mohanlal Sukhadia University, a UGC recognized, Autonomous State University of Government of Rajasthan established by an Act in 1962, having its headquarters at Udaipur, represented through Registrar which expression shall repugnant to the context of meaning thereof includes its successors and permitted assignees of the FIRST PARTY

AND

Maharaj Ganga Singh University, a UGC recognized, Autonomous State University of Government of Rajasthan established by an Act in 2003, having its headquarters at Bikaner, represented through Registrar which expression shall repugnant to the context of meaning thereof includes its successors and permitted assignees of the SECOND PARTY.

The First and the Second Party, Collectively also referred to as the `Parties`

WHEREAS, The Mohan Lal Sukhadia University was established by Government of Rajasthan by an Act in 1962, to cater the needs of people of South Rajasthan. It has 13 departments under four constituent colleges of which the Department of Geology under the College of Science is one.

AND WHEREAS, the Mohanlal Sukhadia University was established to provide knowledge and quality education to all sections of the society. Its prime goal is intellectual and academic development of society and students.

WHEREAS, The Department of Geology under the College of Science is having a Research Project sponsored by the Seismology Division of the Ministry of Earth Science, New Delhi for establishment of Permanent Global Positioning Receiver Stations at four sites in Rajasthan as a part of the National Network of GPS Receivers and Bikaner is one of the selected locations.

WHEREAS, The Maharaj Ganga Singh University was established by Government of Rajasthan by an Act in 2003, to cater the needs of people of North Rajasthan. It has 5 departments of which the Department of Environmental Sciences is one.

AND WHEREAS the Maharaj Ganga Singh University was established to provide knowledge and quality education to all sections of the society. Its prime goal is intellectual and academic development of society and students.

WHEREAS both the parties and their respective departments viz. the Department of Geology at Mohanlal Sukhadia University and Department of Environmental Sciences at Maharaja Ganga Singh University at Bikaner have recognized the potential of being the part of the National Network of Global Positioning Receivers.

Now this Deed of MoU witnessed is as follows:

Objectives:

To collaborate in establishing a Permanent Global Positioning Station in the campus of Maharaja Ganga Singh University, Bikaner, this will be a part of National Network of GPS receivers.

Scope:

1. The Global Positioning System collects data from the satellites which can be used for the study of crustal movements, atmospheric behaviour, weather forecasting etc.

Modalities of working:

1. The Principal Investigator and the Co Principal Investigator of the sponsored project at Mohan Lal Sukhadia University, Udaipur will coordinate with a nominated Coordinator from Maharaja Ganga Singh University, Bikaner for the identification of GPS Receiver site as per the norms, its construction as per the design and the existing BSR Rates and its maintenance and safety during the duration of the project.

Funding:

1. The funding for the construction and contingencies for the Receiver site will be provided by the Mohan Lal Sukhadia through the funds received by them by the Seismology Division of the Ministry of Earth Science, New Delhi.
2. A sum of Rs 3000.00 per month will be sent to the Coordinator at Maharaja Ganga Singh University, for the Ward and Watch of the GPS Receiver site at their campus.
3. All stations establishing under National GPS program are permanent. Therefore, the operation and maintenance of the station will be in continuous mode for long run.

Data Sharing:

1. Regarding data sharing policies, the data may be shared among Indian Scientists but it should not be shared with any private/ foreign agency without prior approval of the Ministry

Applicabe Law:

The MoU shall may be governed, construed and enforce in accordance with the laws of India.

Witnesses:

In witness whereon the Parties hereto have signed and executed this Meomrandum of Understanding at _____ on the 31 Day of May, 2012, in the presence of each other and in presence of attending witnesses.

For on behalf of M.L. Sukhadia University
University

(Mr L.N. Mandaj)

Registrar

Registrar
MOHANLAL SUKHADIA UNIVERSITY
UDAIPUR

M.L. Sukhadia University

For on behalf of Maharaja Ganga Singh

7/5/2012

(Mr ARVIND SINGH)

Registrar

Registrar M.G.S. University,
Bikaner (Raj.)

Maharaja Ganga Singh University

Witnesses:

1._____ 2._____

3._____ 4._____