

A training session report on
Water Resource Management

Under STUTI program funded by DST



In association with
Indian Institute of Technology, Gandhinagar
(Project Management Unit)



Coordinated by
Prof. Vibhuti Rai
Department of Geology
University of Lucknow
Uttar Pradesh India

30th May to 5th June, 2023

Acknowledgement

We convey gratitude for the encouragement and support received from multiple sources during the execution of this training since its beginning. First and foremost, we want to express our sincere appreciation to the IIT Gandhinagar (PMU) and Department of Science and Technology (DST) for entrusting us with this project. The workshop was coordinated by **Prof. Vibhuti Rai** (Professor, Geology, LKU). The workshop was conducted on the '*Water Resource Management*' on the instrument funded by the PURSE program (Sanction No.: SR/PURSE Phase 2/29 (C)). Organizing team acknowledge the contributions of the committee, in the implementation and the execution of the program to achieve the objectives of the project.

We also acknowledge all the teaching and non-teaching staff for their contributions, without which these could not have been possible.

Prof. Vibhuti Rai
Coordinator

Summary

The goal of this training session is to provide a hands-on training on Water Resource Management which involves various aspects of earth science among students, faculty, scientists and industry professionals through a week-long training workshop. The workshop was conducted in the Department of Geology University of Lucknow, from **30th May to 5th June 2023** and comprised of lectures and hands-on training sessions. This initiative is funded by Department of Science & Technology under the program STUTI (Synergistic Training Program Utilizing the Scientific and Technological Infrastructure). This training program was focused on *‘providing an exposure towards aspects of water resources and its management for its future consideration by the medium of hands-on as well as visit to various places of historical significances’*.

Introduction

Department of Geology, University of Lucknow conducted 7-day long hands-on training program on 'Water Resource Management' in its campus for participants from various backgrounds such as Post Graduates, Faculties, Scientists, Research Fellows, Ph.D. Fellows and Industry persons were invited (**Annex-1**). The following workshop's activities took place from **30th May to 5th June** 2023 (**Annex-2 & 3**). This report provides a quick overview of both the lecture and technical sessions.

- Lecture Sessions:

Prof. K. P. Vimal and **Prof. Alok Kumar Rai** (Vice-Chancellor, University of Lucknow) was invited as a chief guest for inauguration of the workshop. **Prof. S. C. Mathur** (JNV University, Jodhpur) gave a talk on 'Hydrological Geo-heritage of India'. Followed to Prof. Mathur in another lecture **Prof. Ajai Mishra** (Head, Geology, University of Lucknow) gave introduction on workshop theme 'Water Resource Management'. **Prof. Vibhuti Rai** (DST-PURSE Coordinator, Geology, LKU) gave a lecture on 'Floods: A remedy for Groundwater Recharge in Urban Sprawls, Assessment from Lucknow City'. **Prof. Anil Mishra** (Head, Chemistry, University of Lucknow, LKU) delivered a lecture on 'spectrophotometry-Fundamental Principles'. **Dr. Manoj Yadav** (Geology, LKU) gave a lecture on case studies on 'Application of Spectroscopic Techniques in Geosciences'. **Prof. Sudhir Mehrotra** (Head, Biochemistry, LKU) gave a lecture on 'Water Pollution and Pollutant Testing'. **Mr. Ravindra S. Sinha** (Senior Hydro-Geologist, Ground Water Department, U.P.) delivered an interesting lecture on 'Ground Water Resource Management-Quantity and Quality'. **Dr. Dhruv Sen Singh** (Geology, LKU) discussed details on 'Climate Change and its Impact on Rivers of India'. **Dr. Sudhakar Shukla** (Remote Sensing Application Center, U.P.) gave a lecture on 'Hydrological Parameters of Urban Sprawls: Varanasi – an Example. **Dr. Rohit Agarwal** (Professional Trainer and Public works Department, U.P.) led a session on 'Application of Arc GIS in Mapping of Water Bodies'. **Prof. K.S S. Mishra** (UPES University, Dehradun, Formerly with Geological Survey of India, Sr. D.Y. Director General) gave an overview on 'Application of Remote Sensing and GIS Techniques in Exploration of Ground

Water and Management of Water Resources – Case Studies from Different Geological Provinces and Climatic Zones’. **Dr. Shishir S. Shrivastava** (D.Y. Director General, Geological Survey of India) gave informative lecture on ‘Ground Resource Potential of Kukrail Watershed – Need for Future Requirement of Water for Lucknow’. **Dr. Ajay Kumar Arya** (Associate Professor, LKU) gave lecture on ‘Application of TNT MIPS V 2021 Software – An Overview’. **Dr. Anamika Singh** (Senior research Scientist, Central Pollution Control Board Lucknow) gave an encouraging lecture on ‘Laboratory Techniques in Water Chemistry Assessment’. **Dr. Ravi Bhatt** (D. LITT., Eminent Historian and LucknowPhile) delivered a lecture on ‘Lucknow Water Heritage and Management – An Ethnic Technique’ **Dr. Rajesh Singh** (Assistant Professor, Geology, LKU) arranged a quiz and test for the participants which is related to the lecture sessions held in previous days.

- Technical Session

On the day one, all the participants were taken to visit DST-PURSE and other lab facilities in the Geology Department, Lucknow University. Day two comprises of hands-on session on ‘UV-Visible Spectrophotometer setup. These sessions were followed the simultaneous supervision of **Prof. Vibhuti Rai**. Day three led with hands-on session on ‘ARC-GIS Software’ by **Dr. Rohit Agarwal**. On the day four, participants were taken for a field visit to Namisharanya, District Sitapur (100 km from Lucknow U.P.) Vist covered some historical places having geological importance such as Chakra Tirth-Artesian Well. Sur Gaddi Area – Open Well, Pond Area – Evidence of Neotectonism, Banks of Gomti River, Hanumangarhi Temple Area and Lalita Devi Temple. On the day five, **Dr. Ajay Kumar Arya** demonstrated and led a training session on TNT MIPS V 2021 Software. On the day six, participants were taken to visit at Central Pollution Control Board Lab (Gomti Nagar) and Bada Imambara Baoli. Day six ends with a valedictory session.

Outcomes of the Workshop

The STUTI workshop attracted participants from 18 different institutes (**Figure 1**). About 32 participants enrolled and attended the ‘Water Resource Management’. The goal of this training event was to bring together participants from many disciplines and raise awareness of the institute's research facilities. Throughout the sessions, participants asked major questions regarding theoretical and practical aspects of geological software tools and its usage. Finally, the feedback from the participants was considered in the evaluation of the workshop (**Annex 4**). The majority of the participants were pleased with the training session and suggested that more workshops be held in the future. Few participants suggested organizing such a workshop/training session on more troubleshooting techniques of data collection.



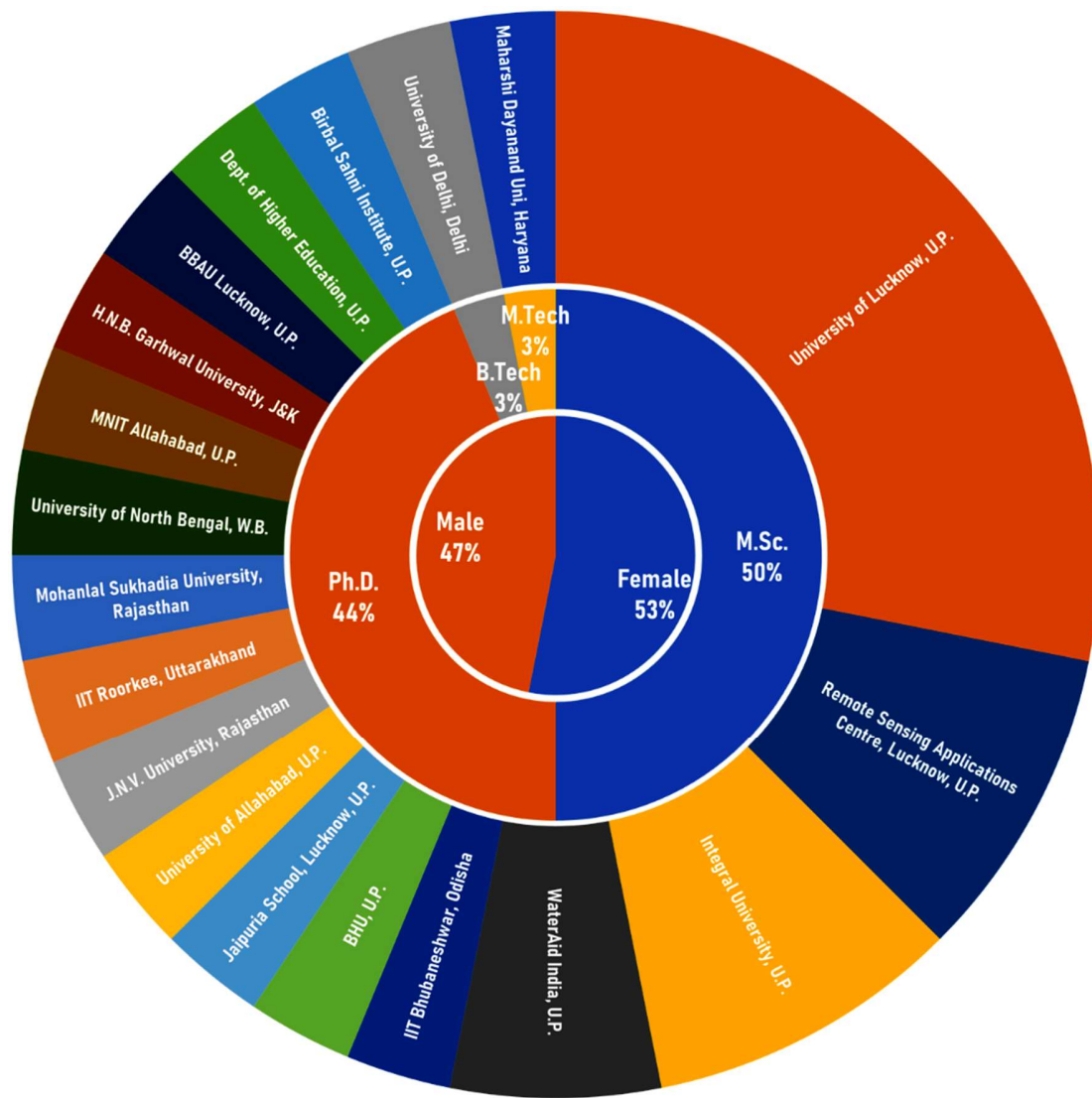
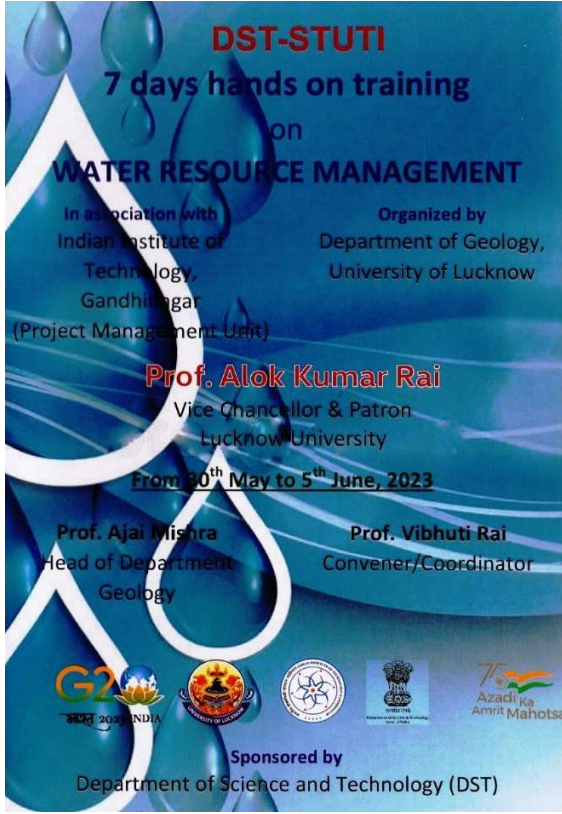


Figure 1. Participants registered workshop from different institutes.

Annexure 1: Brochure for the program.



DST-STUTI
7 days hands on training
on
WATER RESOURCE MANAGEMENT

In association with Indian Institute of Technology, Gandhinagar (Project Management Unit) Organized by Department of Geology, University of Lucknow

Prof. Alok Kumar Rai
Vice Chancellor & Patron
Lucknow University
From 30th May to 5th June, 2023

Prof. Ajai Mishra
Head of Department
Geology Prof. Vibhuti Rai
Convener/Coordinator

Sponsored by
Department of Science and Technology (DST)


the effectiveness of the strategies such as master plans and projects. In order to help stakeholders to develop master plans and projects which consider the anticipated risks (e.g. the effect of climate change and urbanization), scientific tools should be applied to estimate the future state of urban water environment - **AROUND 30 STAKEHOLDERS.**

ELIGIBILITY CRITERIA

- Eligibility criteria for participants for the Training Program:
 - Person of Indian origin;
 - Minimum qualification should be Graduation (Science) or B. Tech. (Technology);
 - Professors/Scientists/ Post-Doc Fellows/ PhD Fellows/ Industry persons / Students who are actively involved in research and development (R&D in the field of Water Resource management);
 - Not more than 3 people from one institute per training should be allowed from outside the host institute.

REGISTRATION FEE - There is no Registration Fees.
Interested participants can register through sending the filled resume template to:
Resume Link:
https://drive.google.com/drive/u/0/folders/1GeK_6Gx0WrfX_Wm1aXSqa1j8Oc0o-F3

Send to:
Email 1: vibhutrair@gmail.com
Email 2: stuti@iitgn.ac.in



भू-विज्ञान विभाग, लखनऊ विश्वविद्यालय
आजादी के अमृत महोत्सव के अवसर पर आयोजित

DST-STUTI
द्वारा प्रायोजित

7 days Hands on Training on Water Resource Management
मंगलवार 30 म 2023, पूर्वाह्न 10:30 बजे
भू-विज्ञान विभाग के
के.पी. विपल प्रेक्षागृह
में आपको साहज आमंत्रित करते हैं।
सम्मानित अतिथि

श्री प्रो. एम.टी. माथुर
एवं
अध्यक्षता

प्रो अलोक कुमार राय
कुलपति, लखनऊ विश्वविद्यालय
लखनऊ
के कर कमलों द्वारा की जायेगी।

उत्सवप्रेक्षी:
प्रो विभूति राय
संयोजक
लखनऊ विश्वविद्यालय
दूरभाष: 7007022700, 9415752111

● कृपया पूर्वाह्न 10 :30 बजे तक आप स्थान ग्रहण कर लें
● यह निमंत्रण पत्र अहस्ताक्षरीय है।
● कार्यक्रम का सजीव प्रसारण होगा।

प्रो अजय मिश्रा
संयोजक एवं अध्यक्ष
भू विज्ञान विभाग
लखनऊ विश्वविद्यालय
दूरभाष: 9450393719

● समारोह का सजीव प्रसारण हमारे you tube चैनल पर होगा जिसको आप सजीव देख सकते हैं।
● <https://youtube.com/@departmentofgeologyunlvar4661>

Annexure 2: List of registered participants for the workshop.

Sr. No.	Candidate Name	Gender	Educational Qualification	Email address	University/Institute
1	Abhimanyu Singh	Female	Ph.D. (Environmental Science)	kavita hooda68@gmail.com	Maharshi Dayanand University, Rohtak, Haryana
2	Abhishek Kumar Singh	Male	Ph.D. (Geology)	abhisheksingh102@gmail.com	University of Lucknow, Uttar Pradesh
3	Anjali Gautam	Female	M.Sc. (Geology)	anjalikrj99@gmail.com	
4	Antara Gupta	Female	Ph.D. (Geology)	antaragupta01@gmail.com	
5	Anushka Mukherjee	Female	M.Sc. (Geology)	anushkajee3105@gmail.com	
6	Daya Shankar Singh	Male	Ph.D. (Hydrogeology)	daya.singhudai@gmail.com	
7	Kunal Maurya	Male	M.Sc. (Geology)	mauryakunal97@gmail.com	
8	Prashant Gautam	Male	M.Sc. (Geology)	gautamprashant034@gmail.com	
9	Rahul K.Verma	Male	Ph.D. (Engineering Geology)	getra hul9@gmail.com	
10	Shivam Chauhan	Male	M.Sc. (Geology)	shivamchauhanlucknow@gmail.com	
11	Aditi Roy	Female	Ph.D. (Hydrogeology)	aroy@geography.du.ac.in	
12	Afreen Bano	Female	M.Sc. (Environmental Science)	afreenshamshuddeen@gmail.com	Integral University, Lucknow, Uttar Pradesh
13	Ghousiya	Female	M.Sc. (Environmental Science)	ghousiyaminhaj@gmail.com	
14	Mohsina Khan	Female	Ph.D. (Environmental Science)	mohsina10khan@gmail.com	
15	Anjali Trivedi	Female	Ph.D. (Botany)	atrivedee@gmail.com	Birbal Sahni Institute of Palaeosciences, Lucknow, Uttar Pradesh
16	Anshumali Sharma	Male	M.Sc. (Geology)	anshumalisharma108@gmail.com	National Service Scheme, Dept. of Higher Education, Govt. of Uttar Pradesh, Uttar Pradesh
17	Anupam Nag	Male	M.Sc. (Geology)	anupamnag99@gmail.com	Babasaheb Bhimrao Ambedkar University, Lucknow, Uttar Pradesh
18	Chetan Gupta	Male	M.Sc. (Geology)	guptachetan416@gmail.com	H.N.B. Garhwal University, Srinagar, Jammu and Kashmir
19	Devendra Kumar Singh	Male	MBA (Marketing)	unforgettabledev@gmail.com	WaterAid India, Uttar Pradesh
20	Sarjeel Khan	Male	B.Tech (Civil Engineering)	sharjeelkhan@wateraid.org	
21	Divya Srivastava	Female	Ph.D. (Environmental Engineering)	dsrivastava4@lko.amity.edu	Motilal Nehru National Institute of Technology, Allahabad, Uttar Pradesh
22	Harshita Khushedia	Female	M.Sc. (Environmental Science)	hkudeshia@gmail.com	Remote Sensing Applications Centre, Lucknow, Uttar Pradesh
23	Kriti Tripathi	Female	M.Tech (Remote Sensing and GIS)	kritiotripathi@gmail.com	
24	Pallavi Singh	Female	M.Sc. (Geology)	pallavisingh15797@gmail.com	
25	Harikala Chhetri	Female	Ph.D. (Geography)	harikalachhetri1995@gmail.com	University of North Bengal, West Bengal
26	Manish Sethia	Male	M.Sc. (Geology)	manishsethia04@gmail.com	Mohanlal Sukhadia University, Udaipu, Rajasthan
27	Praveen Kumar	Male	Ph.D. (Geology)	35praveen35@gmail.com	IIT Roorkee, Uttarakhand
28	Saurabh Mathur	Male	Ph.D. (Geology)	saurabhmathur756@gmail.com	J.N.V. University, Jodhpur, Rajasthan
29	Shailendra K. Chaudhary	Male	Ph.D. (Geology)	choudhary92shai@gmail.com	University of Allahabad, Uttar Pradesh
30	Shilpi Chakraverty	Female	MBA (Petroleum Technology and Management)	chakravertyshilpi@gmail.com	Jaipuria School, Lucknow, Uttar Pradesh
31	Sonalika Jena	Female	Ph.D. (Geology)	sonalikajena96@gmail.com	Banaras Hindu University, Uttar Pradesh
32	S. Rajalakshmi	Female	M.Sc. (Geology)	22gg05008@iitbbs.ac.in	IIT Bhubaneswar, Odisha

Annexure 3: Schedule date and activities during the workshop.

Detailed Program – Day 1 (30 th MAY 2023)	
VENUE – DEPARTMENT OF GEOLOGY, UNIVERSITY OF LUCKNOW	
TIME	INAUGURAL SESSION
10:00 – 11:30	REGISTRATION
11.30 - 13.30	INAUGURAL SESSION
13:30 – 14:30	LUNCH BREAK
14:30 – 17:30	INTRODUCTION FOCAL THEME/ PARTICIPANTS INTERACTION
Detailed Program – Day 2 (31 st May 2023)	
VENUE – DEPARTMENT OF GEOLOGY, UNIVERSITY OF LUCKNOW	
TIME	TECHNICAL SESSION -1
09:30 – 11:30	Lecture 1: PHYSICS OF SPECTROPHOTOMETERS-UV VISIBLE
12:00 – 13:30	Lecture 2: UV-VISIBLE SPECTROPHOTOMETER – AN OVERVIEW
13:30 – 14:30	LUNCH
TIME	TECHNICAL SESSION -2
14:30 – 16:00	Lecture 3: REMOTE SENSING- THE FRONTIERS OF SPACE
16:00 – 17:30	Lecture 4: TNT MIPS V2021 SOFTWARE- AN OVERVIEW
Detailed Program – Day 3 (1 st June 2023)	
VENUE – DEPARTMENT OF GEOLOGY, UNIVERSITY OF LUCKNOW	
TIME	TECHNICAL SESSION - 3
09:30 – 11:30	Lecture 5: INTRODUCTION TO WATER QUALITY ANALYSIS
12:00 – 13:30	Lecture 6: ANALYTICAL TECHNIQUES EMPLOYE IN WATER QUALITY WITH EXAMPLE
13:30 – 14:30	LUNCH
14:30 – 17:30	TECHNICAL SESSION - 4
Detailed Program – Day 4 (2 nd June 2023)	
VENUE – DEPARTMENT OF GEOLOGY, UNIVERSITY OF LUCKNOW	
TIME	FIELD WORK
08:00 – 18:30	VISIT TO NAMISHARANYA, AN ARTESIAN WELL OVEREXPLOITATION, REVIVAL PLAN
Detailed Program – Day 5 (3 rd June 2023)	
VENUE – DEPARTMENT OF GEOLOGY, UNIVERSITY OF LUCKNOW	
TIME	TECHNICAL SESSION – 5
09:30 – 11:30	Lecture 7. ROCKWORKS STANDARD SOFTWARES
12:00 – 13:30	Lecture 8. MAPPING WATER BODIES BY REMOTE SENSING & SATELLITE DATA
13:30 – 14:30	LUNCH
14:30 – 17:30	TECHNICAL SESSION – 6
Detailed Program – Day 6 (4 th June 2023)	
VENUE – DEPARTMENT OF GEOLOGY, UNIVERSITY OF LUCKNOW	
TIME	TECHNICAL SESSION – 7
09:30 – 11:30	Lecture 9. WATER BASED SOFTWARE- AN INTRODUCTION
12:00 – 13:30	LUNCH
13:30 – 17:30	LOCAL LAB VISIT + FIELD VISIT (LUCKNOW CITY VISIT) CONVENTIONAL WATER RESOURCE MANANGEMENT
Detailed Program – Day 7 (5 th June 2023)	
VENUE – DEPARTMENT OF GEOLOGY, UNIVERSITY OF LUCKNOW	
TIME	TECHNICAL SESSION – 8
9:30 – 13:30	EXERCISE/ TEST/ SELF SAMPLE ANALYSIS/ FORM FEEDBACK
13:30 – 14:30	LUNCH
14:30 – 17:30	VALEDICTORY

Annexure 4: Feedback summary

S.No.	Content	Rating
1	Overall grading of the Programme with reference to relevance of course, module/content etc.	100% rated above 8 points
2	Overall grading of the facilities provided by the institute, i.e., Hostel, Mess, Class Rooms, Transport/infrastructure etc.	96% rated above 8 points
3	Overall grading of the faculty members conducting the training	94% rated above 8 points
4	How do you rate the overall training methodology	97% rated above 8 points
5	How far the field visit is relevant and related to your research study	89% rated above 8 points
6	Usefulness of this training in your current role	90% rated above 8 points
7	Usefulness of this training in future work/job you may handle	92% rated above 8 points
8	How far have you benefitted from interaction with the fellow participants of the training	97% rated above 8 points
9	How far the course material supplied relevant and related to the training curriculum	92% rated above 8 points
10	Overall grading of the process of training	95% rated above 8 points
11	Your recommendation to your peers/ colleagues for the training Programme	98% rated above 8 points