AGENDA AND AGENDA NOTES

78th meeting of the

Technical Advisory Committee (TAC) of N.I.H.

APPENDICES

(Vol.-II)

August 08, 2024
at 11:00 Hours
Through Online Meeting

NATIONAL INSTITUTE OF HYDROLOGY
ROORKEE – 247 667

APPENDIX No. A78.1

MINUTES OF THE 77TH TAC MEETING

Minutes of 77th meeting of Technical Advisory Committee (TAC) of National Institute of Hydrology, Roorkee held on 19th February 2024 (Online mode)

The 77th meeting of the Technical Advisory Committee (TAC) of the National Institute of Hydrology, Roorkee was held in online mode on 19th February, 2024. The meeting was chaired by Shri Kushvinder Vohra, Chairman, CWC. The list of the participants is given in Annexure-I.

Dr. M. K. Goel, Director, NIH first welcomed the Chairman (TAC), members and invitees to the meeting. He briefed about the role of the Working Group and Regional Coordination Committees constituted to review the work programme at Headquarters and Regional Centers of NIH. After a round of brief introduction of members, invitees and all Heads of Divisions and RCs of NIH, the Director invited the Chairman, TAC for his opening remarks.

At the outset, the Chairman welcomed all the participants to the meeting. The Chairman, in his opening remarks, stressed on the need to carry out relevant technical work/studies ensuring to avoid any duplication of work which is already done/under-progress by other Government departments. The Chairman stressed that climate change and its impact on water resources is already being realized in the country in the form of hydrological extremes. Accordingly, there is need to make short, medium and long-term plans to meet the challenges in management of our water resources under various uncertainties/extremes. The Chairman appreciated about the achievement of patent by NIH related to the Fluoride removal media for drinking water and suggested to explore its outreach for maximum utilization by the society. He also suggested to work together with line-organizations like CWC, CGWB, etc. in various areas of water resources. Director, NIH suggested that there should be active collaboration between CWC & NIH for carrying out specific studies which are of interest to both the organizations. The Chairman also desired to identify needs for capacity building of scientists in various areas of hydrology & water resources and to impart and conduct training activities.

After opening remarks by the Chairman, the Director, NIH gave a brief overview of the Institute's activities. Thereafter, he requested all Divisional Heads to give an overview of activities of their respective Divisions at HQ. Accordingly, all the Divisional Heads at HQs Roorkee [Surface water hydrology division, Environmental hydrology division, Hydrological Investigations division, Water resources systems division, Groundwater hydrology division, and Centre of cryosphere and climate change studies (C4S)] briefly apprised the TAC about some important technical activities of respective scientific divisions through brief presentations.

The Chairman, along with some other members, appreciated the NIH for carrying out R&D studies in various important areas of hydrology & water resources and advised that the outcome of the completed studies may be highlighted. He further stressed that while planning new studies, the relevant stakeholders/concerned organizations (CWC, CGWB, etc.) may be contacted to get relevant information so as to avoid any duplication.

After brief presentations of the respective Divisional Heads, the Director invited Shri Omkar Singh, Scientist "G" & Head, Technical Cell/Member-Secretary to take up the agenda items in the meeting.

ITEM NO. 77.2: Confirmation of the minutes of 76th meeting of TAC

The Member-Secretary informed that minutes of the 76th meeting of TAC, held on Aug.29, 2022 were circulated to all the members and invitees vide email dated Oct. 17, 2022. Since no comments were received from the members, the minutes were confirmed by the TAC.

ITEM NO. 77.3: Actions taken on decisions/recommendations in the previous meeting

The Member-Secretary presented the actions taken on the comments and suggestions of the members during the previous meeting. On the issue of pending case of the creation/cadre review of a post of documentation officer to look after the requisite task of compilation of hydrological research in India on identified topics, the Chairman advised to hire a consultant to perform the requisite work. Regarding the completed study on water quality assessment of South-west Punjab emphasizing carcinogenic contaminants and their possible remedial measures, it was informed that comments by the experts have been incorporated in the report. The Chairman advised that the study may be sent to NMCG for expert review.

For effective collaboration of NIH with CWC on specific areas of research (viz. climate change studies etc.), the Chairman suggested to send a note to CWC for taking up the matter for nominating a nodal officer from CWC. Regarding the study entitled "Long term hydrological assessment for the development of water security plan for three sub-basins namely Barak, Minor rivers draining into Bangladesh and Minor rivers draining into Myanmar sub-basins in the state of Mizoram" it was informed that the confidentiality of the study/report will be duly mentioned at the cover page while submitting to NPMU.

ITEM NO. 77.4: Status of the work programme for the year 2022-23

The Member-Secretary briefly mentioned about the studies carried out by the Institute during the year 2022-2023. He reported that 15 sponsored projects and 12 internally funded R&D studies were completed during the year. The following three studies were planned for detailed presentation during TAC Meeting:

- A brief presentation of NH Model developed under NHP jointly by IIT, Kharagpur and NIH (Prof. R. Singh, IIT-KGP & Dr. A.K. Lohani, Sc. G).
- Impacts of glacier and climate change on runoff for selected basins of Himalayan region (PI: Dr. Vishal Singh, Sc. D)
- Integrated GEE-MODFLOW based Groundwater Recharge Assessment System for Hindon River System (Dr. Nitesh Patidar, Sc. C).

The Chairman desired to discuss the findings of the completed studies in detail in the next TAC meet. Dr. Suhas P. Wani advised to report important outcome/summary of completed studies along with utility for common public/other stakeholders. Prof. K.V. Jayakumar advised to carry both basic and applied research in relevant areas including urban flood. It was informed that brief description of all studies (ongoing/completed) during the year have been briefly presented in Appendices.

The Member-Secretary also presented the technical achievements of the Institute during 2022-23. The Chairman appreciated the achievements made by NIH during the year. The Chairman desired a common platform for NIH and CWC for regular interaction. The Chairman expressed his desire that a 1 – 2 days meeting detailing the outcome of various studies may be organized in near future (in April – May, 2024) at NIH, Roorkee. The Director, NIH expressed that next meet of TAC can be held for 1-2 days at NIH Roorkee (after the organization of Working Group and RCC meetings) so that detailed presentations of some important NIH studies can be made.

TAC noted the progress of the studies/projects of the Institute during the year 2022-2023.

Additional comments/suggestion were also received from Prof. Rohit Goyal (MNIT, Jaipur) through e-mail. He expressed the need for better collaboration amongst technical Institutes and NIH Regional Centers to avoid duplication as well as to undertake more focused and relevant research. In this connection, he proposed collaboration through opening of Regional Academic Centre for Hydrological Research (RACHR or whatever name is proposed) in different zones.

ITEM NO. 77.5: Proceedings of the Working Group and Regional Coordination Committee (RCC) meetings

The Member-Secretary briefly mentioned about the 53rd meeting of the Working Group of NIH which was held during 16-17 March, 2023 and the RCC meetings held at the different Regional Centers. During these meetings, the Working Group/RCC members reviewed the progress of studies for the year 2022-2023 and recommended the work program for 2023-24. The TAC noted the proceedings of 53rd WG and RCC meetings.

ITEM NO. 77.6: Work Program for the year 2023-24

The Member-Secretary briefly mentioned about the proposed work programme of the Institute for the year 2023-24 which was discussed during the 53rd Working Group meeting and various RCC meetings of NIH. The proposed work programme of the Institute for F.Y. 2023-24, as recommended by the Working Group and the respective RCCs, was also placed before the TAC. TAC approved the work programme of the Institute for the year 2023-24 (Annexure-II).

ITEM NO. 77.7: Major projects and activities of national importance

The Member-Secretary informed that following two major R&D projects are currently ongoing at NIH:

1. National Hydrology Project (NHP)- funded by The World Bank & GoI
2. Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)- funded by DST (GoI)

ITEM NO. 77.8: Reporting Items

The Member Secretary informed that the NIH has completed 11 consultancy projects and 36 consultancy projects were ongoing during the year 2022-23, as sponsored by various agencies.

ITEM NO. 77.9: Additional items with the permission of the Chair

Director, NIH informed that a non-contact discharge estimation methodology has been developed recently (at Ph.D. work at DoH, IIT-Roorkee) and subsequent modified and the same needs to be tested at some gauging stations before its recommendation for wider applicability. Further, CWPRS has developed another non-contact methodology based on infrared sensor and photography. It is desirable to test and verify the results of various techniques before their wider usage. As CWC has a vast network of discharge gauging stations in the whole country, he suggested to identify 3- 4 gauging sites of CWC in different parts of the country (probably with facilities of ADCP, AWLR, AWVR etc.) for testing of the methodologies and comparison of results. The Chairman agreed and advised to consult with Shri D. P. Mathuria, CE (CWC) in this matter. Prof. M. K. Jain (DoH, IIT-Roorkee) informed that DoH, IIT-Roorkee is having a MoU with CWC and they are jointly monitoring/testing the advanced methodologies in the Bhagirathi river basin (Uttarakhand).

The meeting ended with a vote of thanks to the Chair.

Annexure-I

LIST OF PARTICIPANTS IN THE 77th MEETING OF TAC OF NIH

1.	Sh. Kushvinder Vohra, Chairman, CWC	In-chair
2.	Sh. S.K. Sibal, Member (D&R), CWC	Member
3.	Shri Manoj Tiwari, CE, HSO, CWC	Member
4.	Dr. M.K. Goel, Director, NIH	Member
5.	Dr. Alok Sikka, IWMI, New Delhi	Member
6.	Prof. K. V. Jayakumar, IIT, Dharwad	Member
7.	Prof. M.K Jain, DoH, IIT, Roorkee	Member
8.	Dr. Suhas Wani, IRRI, SARC, Varanasi	Member
9.	Prof. Rohit Goyal, CE Dept., MNIT, Jaipur	Member
10.	Er. Omkar Singh, Sc. G & Head, Technical Cell, NIH	Member-Secretary

INVITEES

1. Dr. A.K. Lohani, Sc. G & Head, SWH Div., NIH, Roorkee
2. Dr. R. P. Pandey, Sc. G & Head, EH Div., NIH, Roorkee
3. Dr. Suhas Khobragade, Sc. G & Head, HI Div. NIH, Roorkee
4. Dr. A.R. Senthil Kumar, Sc. G & Head, WRS Div., NIH, Roorkee
5. Dr. Anupma Sharma, Sc. G & Head, GWH Division, NIH, Roorkee
6. Dr. Surjeet Singh, Sc. G & Head, C4S, NIH, Roorkee
7. Dr. Y. R .S. Rao, Sc. G & Head, RC-Kakinada
8. Dr. B. Venkatesh, Sc. G & Head, RC- Belagavi
9. Dr. Pankaj Mani, Sc. G & Head, CFMS-Patna
10. Dr. T. R. Nayak, Sc. G, RC, Bhopal
11. Dr. Ravi Galkate, Sc. F & Head, RC-Bhopal
12. Dr. R. K. Jaiswal, Sc. F, NIH, RC-Bhopal
13. Dr. Sanjay Kumar Sharma, Sc. D, RC, Guwahati
14. Dr. P.G. Jose, Sc. E & Head, RC, Jammu.
15. Dr. M. S. Rao, Sc. G, NIH, Roorkee
16. Dr. P. C. Nayak, Sc. F, NIH, Roorkee
17. Dr. Sanjay Kumar, Sc. F, NIH, Roorkee
18. Dr. M. K. Sharma, Sc. F, NIH, Roorkee
19. Dr. Soban Singh Rawat, Sc. F, NIH, Roorkee
20. Dr. T. Thomas, Sc. E, NIH, RC-Bhopal
21. Dr. M.K. Nema, Sc. E, NIH, Roorkee
22. Dr. R.V. Kale, Sc. E, NIH, Roorkee
23. Dr. Pradeep Kumar, Sc. E, NIH, Roorkee
24. Shri J. P. Patra, Sc. E, NIH, Roorkee
25. Dr. L. N. Thakural, Sc. E, NIH, Roorkee
26. Dr. P. K. Singh, Sc. E, NIH, Roorkee
27. Dr. Sumant Kumar, Sc. E, NIH, Roorkee
28. Dr. Rajesh Singh, Sc. E, NIH, Roorkee
29. Dr. Gopal Krishan, Sc. E, NIH, Roorkee
30. Dr. Ashwini A. Ranade, Sc. D, NIH, Roorkee

31. Dr. P. K. Mishra, Sc. D, NIH, Roorkee
32. Dr. Vinay K. Tyagi, Sc. D, NIH, Roorkee
33. Dr. S.M. Pingale, Sc. D, NIH, Roorkee
34. Dr. Sunil Gurrapu, Sc. D, NIH, Roorkee
35. Dr. Vishal Singh, Sc. D, NIH, Roorkee
36. Ms. Shashi P. Induwar, Sc. D, RC, Bhopal
37. Dr. Vishal Singh, Sc. D, NIH, Roorkee
38. Dr. Vishal Singh, Sc. D, NIH, Roorkee
39. Ms. Swapnali Barman, Sc. D, RC Guwahati
40. Dr. Tripti M., Sc. D, NIH, Roorkee
41. Dr. Nitesh Patidar, Sc. C, NIH, Roorkee

APPENDIX No. A78.2

MINUTES OF THE 54TH WORKING GROUP MEETING (February 22 – 23, 2024)

NATIONAL INSTITUTE OF HYDROLOGY, ROORKEE

Minutes of the 54th Meeting of NIH Working Group
(22-23 Feb., 2024)

The 54th meeting of NIH working group was held during 22-23 Feb., 2024 at Roorkee under the Chairmanship of Dr. M.K. Goel, Director (NIH). A list of participants of the meeting is given in Annexure-I.

ITEM NO. 54.1: OPENING REMARKS BY THE CHAIRMAN

The Chairman, WG, welcomed the WG members and the Scientists of NIH. He informed that the objective of this meeting is to review the progress of 2023-24 and to formulate the work program of 2024-25. Before initiating proceedings of the WG meeting, the Chairman requested the WG members to give their general observations, suggestions and remarks on the scientific activities of the Institute. These are summarized below:

S. No	Member	Suggestion(s)
1.	Dr. Bhishm Kumar	▪ Suggested to carry out extensive review while planning a new stu ▪ Suggested to include beneficiary in all studies ▪ Develop a database and share it in the public domain ▪ Suggested to take up collaborative studies as team and avoid isola studies
2.	Dr. Manoj P. Samue	Need to work together with related organisations to overco challenges of climate change. ▪ Suggestion for data base and data sharing
3.	Sh. Sudhindra Moha Sharma	Dissemination of knowledge/R&D output from lab to field for bene of public/stakeholders ▪ To carry out studies in focussed areas including the wetlands
4.	Prof. S.S Grewal	▪ To do R&D keeping in view the need of common man and oth stakeholders
5.	Prof. M.L. Kansal	Suggestion for carrying out inter-division & collaborative R&D wor
6.	Dr. (Mrs.) Sadhana Malhotra	The WG meeting can be held for three days instead of two days in order to g more time for presentations and subsequent discussions. The suggestions/ recommendations by the experts in the previous meeting, a the action taken, should be mentioned during the presentations of ongo studies. PERT/CPM and Gantt charts can be useful tools to plan and apply in all research studies so that they are completed on time. Deliverables for stakeholders may be clearly delineated in all the presentatio A few short films can be regularly made highlighting some of the studies a uploaded on the NIH website, youtube and other social media for wi circulation and benefit of the society at large. Engagement of retired scientists to utilize their experience/knowledge Institute's R&D activities
7.	Prof. Ramakar Jha (online)	The scientific divisions should plan to write text books in their dom areas of R&D Suggestion to convert R&D works in IS codes
8.	Dr. Praveen Thakur	▪ To carry out collaborative research Assured full support to NIH for studies involving application RS&GIS with state of art applications and facilities

		Encouraged to utilise all features of SWAT model for water quantity well as for water quality aspects of watersheds ▪ Induction training of Scientists
9.	Er. Pankaj Kumar Sharma	▪ Appreciated for having nice interactions with NIH during WG ▪ Need to devise a mechanism for data sharing b/w CWC & NIH

After brief introduction about NIH activities, the Chairman asked the Member-Secretary to take up the agenda of this meeting.

ITEM No. 54.2: CONFIRMATION OF MINUTES OF 53rd MEETING OF WORKING GROUP

The 53rd meeting of the Working group was held during 16-17 March, 2023. The minutes of the meeting were circulated to all the members and invitees vide letter No. **RMOD/WG/NIH-10 dated 1st May, 2023**. The members confirmed the minutes of the 53rd Working Group meeting.

ITEM No. 54.3: ACTION TAKEN ON THE DECISIONS/RECOMMENDATIONS OF THE PREVIOUS WORKING GROUP MEETING

Er. Omkar Singh, Scientist G & Head (Technical Cell)/Member Secretary (WG) gave a brief account of the actions taken on the recommendations/ decisions of the 53rd working group meeting.

ITEM Nos. 54.4 & 54.5: PRESENTATION AND DISCUSSION ON THE STATUS AND PROGRESS OF THE WORK PROGRAMME FOR YEAR 2023-24 AND FINALIZATION OF THE WORK PROGRAMME FOR YEAR 2024-25

The Member-Secretary requested the respective Divisional Heads to present the progress of studies carried out during 2023-24 and also to present the proposed studies for F.Y. 2024-25. Accordingly, the progress of various studies and sponsored projects, and proposal for new studies and projects during 2024-25, were presented by all Scientific Divisions during the two-day deliberations of the Working Group. The outcome of the Division-wise study/project presented during the meeting are given in the following.

CENTRE FOR CRYOSPHERE AND CLIMATE CHANGE STUDIES (C4S)

The overview of the technical activities of Centre for Cryosphere and Climate Change Studies (C4S) was presented by Dr. Surjeet Singh, Scientist 'G' & Head. The Working Group was appraised about the scientific manpower, status of completed and ongoing studies, consultancy projects, publications, and technology transfer activities. Subsequently, the scientists of the Division were invited to present the completed studies, progress of ongoing internal studies and proposed new studies. The Comments/suggestions of Working Group members are summarized below:

Progress of Work Program for 2023-24

S. No	Title of Project/Study	Recommendations/ Suggestions
Internal Studies (Completed)		
1.	Climate Change Scenarios for Andhra Pradesh and impact on streamflow and groundwater levels Pennar River Basin	PI requested for an extension of 06 months, completing the objective related groundwater, which was approved by W members till Sept. 30, 2024.
Internal Studies (Ongoing)		
1.	Ascertaining the efficacy of use of State-of-the-art technologies for spring mapping and sustainability of springs through suitable interventions	No specific comments.
2.	Geo-Hydro-Chemical and Isotopic aspects of occurrence of Springs: A case study from the major settlement areas of Bhagirathi basin, Uttarakhand, India	Sh. Sudhindra Mohan Sharma advised that local geology should also be considered in the study.
3.	Real-time monitoring of snow-glacier related parameters and Ensemble Hydrological Modeling (EHM) to study the Triloki Group of Glaciers and Khatling glaciers part of Western Himalaya, India under climate change scenarios	Dr. Bhishm Kumar suggested to compare runoff fractions with isotopic measurements. Dr. R. P. Pandey enquired the need of ensembles-based modeling which was clarified by the PI.
4.	Investigation on occurrences of extreme rain events across Northwest Himalaya in relation to global atmospheric thermal and circulation changes	Chairman, WG suggested to check extreme events with the cloudburst database developed in the earlier study (NMSHE). Dr Praveen Thakur suggested to use satellite data in addition to IMD gridded data to identify extremes.
5.	Early Signatures of 21st Century on Snow Cover Dynamics in Zanskar River Basin, Ladakh	PI requested for an extension of 03 months. WG Members approved the extension till June 30, 2024.
6.	Comparative Analysis of Fine Scale Satellite & Reanalysis Precipitation Products in Upper Ganga Basin using Multi-criterion Decision-Making	Dr. Praveen Thakur from IIRS proposed incorporating IMD gridded precipitation data and the CHIRPS dataset into the analysis. Chairman WG, on request of PI, approved the omission of MCDM and GDM analyses as performance evaluations are sufficiently evident from the performance metrics. PI also requested for an extension of 03 months which was approved by WG members till June 30, 2024.

7.	Monitoring and Modelling of the Gangotri glacier catchment under different Climate Scenarios	The title and objectives of this study were revised to include glacier mass balance and supraglacial lakes monitoring. Chairman, WG suggested speeding up the process of AWS installation at Gangotri catchment. Dr. Bhishm Kumar suggested to include isotopic observations and comparing them with past data. Dr. Praveen Thakur suggested comparing the observations with the ongoing data from the Gangotri town.
Internal Studies (New)		
1.	Inventory of Glaciers and Glacial Lakes in Indian Himalayan Region	Dr. Praveen Thakur suggested to change the title as "Updation of Glaciers and Glacial Lakes in Indian Himalayan Region" because NRSC has already prepared an inventory.
2.	Assessment of Hydrological Extremes and Impact on Future Water Availability in Pennar River Basin under Changing Climate	Chairman, WG suggested that the study period shall be reduced to 01 year.
3.	Glacio-hydrological and GLOF investigations over the Triloki glacier, Bhaga basin, Western Himalaya	IIRS Dehradun has been included as collaborator in the study as per discussion during the meeting.
4.	WRF-based dynamical downscaling of CMIP6 climate projections over Himalaya and surrounding Region	Dr. R. P. Pandey suggested to compare the results with other dynamically downscaled datasets.
5.	Integrated long-term monitoring of Khatling Glacier, Bhilangana basin, Uttarakhand	Chairman, WG advised to shift the objective pertaining to establishment of base camp and hydro-meteorological observatories to the methodology part.
6.	A Spatially Explicit Assessment of CMIP6 General Circulation Models for the Indian Himalayan Region	No specific comments.
7.	Climate change impacts on water resources availability and hydropower potential assessment in the Himalayan Satluj river basin (up to Kasol).	Dr. Grewal suggested to incorporate Forest Department, Shimla data of the Satluj river basin in the study.
8.	Influence of Climate Change and Future Response of the Milam Glacier (Central Himalaya, India): Science – Practice - Policy	No specific comments.
Sponsored/Collaborative Projects (Completed)		
1.	Identification of Source and Causes of the gushing water in the premises of Jaypee Colony in the night of 02 January, 2023	No specific comments.
2.	Long term hydrological assessment for the development of water security plan into three sub-basins, namely Barak, minor rivers draining into Bangladesh and minor rivers draining into Myanmar subbasins in the state of Mizoram	Not presented.
Sponsored/Collaborative Projects (Ongoing)		
1.	Assessment of glacier-climate functional relationships across the Indian Himalayan region through long-term network observations	Not presented.

2.	Satellite based mountain hazard assessment and monitoring (MHAM) in Uttarakhand, joint with IIRS Dehradun – Sponsored by IIRS	Not presented.
Consultancy Studies (Ongoing)		
1.	System Studies for Proposed Farakka-Sundarban Link Project	Not presented.

Recommended Work Programme for the Year 2024-25

S. No.	Title of Project/Study	Study Team	Duration	Funding
Internal Studies				
1.	Ascertaining the efficacy of use of State-of-the-art technologies for spring mapping and sustainability of springs through suitable interventions	SS Rawat (PI), SM Pingale, PK Mishra, DS Bisht, Rajesh Singh	3 years (04/22-03/25) Ongoing	NIH
2.	Geo-Hydro-Chemical and Isotopic aspects of occurrence of Springs: A case study from the major settlement areas of Bhagirathi basin, Uttarakhand, India	SS Rawat (PI), Suhas Khobragade, MK Sharma, MS Rao, SM Pingale, PK Mishra	03 Years (04/23-03/26) Ongoing	NIH
3.	Climate Change Scenarios for Andhra Pradesh and its impact on streamflow and groundwater levels in Pennar River Basin	Sunil Gurrapu (PI) YRS Rao, RV Ramana, Nitesh Patidar, TVNAR Kumar, CE, WRD, AP	02 years (04/22-09/24) Ongoing	NIH
4.	Real-time monitoring of snow-glacier related parameters and Ensemble Hydrological Modeling (EHM) to study the Triloki Group of Glaciers and Khatling glaciers part of Western Himalaya, India under climate change scenarios	Vishal Singh (PI), Surjeet Singh, Sunil Gurrapu, Lavkush Patel, Akshaya Verma, Madhusudan Thapliyal	05 Years (03/23-02/28) Ongoing	NIH
5.	Investigation on occurrences of extreme rain events across Northwest Himalaya in relation to global atmospheric thermal and circulation changes	Ashwini Ranade (PI), PK Mishra, Sunil Gurrapu	03 years (04/22-03/25) Ongoing	NIH
6.	Early Signatures of 21st Century on Snow Cover Dynamics in Zanskar River Basin, Ladakh	DS Bisht (PI) PG Jose	03 years (07/21-06/24)	NIH
7.	Comparative Analysis of Fine Scale Satellite & Reanalysis Precipitation Products in Upper Ganga Basin using Multi-criterion Decision-Making	DS Bisht (PI) MK Goel	02 years (06/22-06/24)	NIH
8.	Monitoring and Modelling of the Gangotri glacier catchment under different Climate Scenarios	Lavkush Kr Patel (PI), Akshaya Verma, Vishal Singh, Kapil Kesarwani, Surjeet Singh, Jatin Malhotra	03 years (04/23-03/26) Ongoing	NIH

9.	Updation of Glaciers and Glacial Lakes in Indian Himalayan Region	Surjeet Singh (PI), Vishal Singh, Lavkush Kr Patel, Akshaya Verma, M. Thapliyal	02 years (04/24-03/26) New	NIH
10.	Assessment of Hydrological Extremes and Impact on Future Water Availability in Pennar River Basin under Changing Climate	Sunil Gurrapu (PI), Surjeet Singh, Vishal Singh, YRS Rao, RV Ramana, M. Thapliyal, TVNAR Kumar, CE, WRD, GoAP	01 year (04/24-03/25) New	NIH
11.	Glacio-hydrological and GLOF investigations over the Triloki glacier, Bhaga basin, Western Himalaya	Lavkush Kr Patel (PI), Akshaya Verma, Vishal Singh, Surjeet Singh	03 years (03/24-03/27) New	NIH
12.	WRF-based dynamical downscaling of CMIP6 climate projections over Himalaya and surrounding Region	Kuldeep Sharma (PI), Ashwini Ranade, Sahidul Islam, Associate Director, CDAC, Pune	03 years (04/24-03/27) New	NIH
13.	Integrated long-term monitoring of Khatling Glacier, Bhilangana basin, Uttarakhand	Akshaya Verma (PI), Vishal Singh, Sunil Gurrapu, Lavkush Patel, Surjeet Singh	04 years (04/24-03/28) New	NIH
14.	A Spatially Explicit Assessment of CMIP6 General Circulation Models for the Indian Himalayan Region	Deepak Singh Bisht (PI), Nitesh Patidar, SS Rawat, Surjeet Singh	02 years (04/24-03/26) New	NIH
15.	Climate change impacts on water resources availability and hydropower potential assessment in the Himalayan Satluj river basin (up to Kasol).	Rajat Kumar (PI), Vishal Singh, Surjeet Singh, Shakti Suryavanshi	02 years (04/24-03/26) New	NIH
16.	Influence of Climate Change and Future Response of the Milam Glacier (Central Himalaya, India): Science – Practice - Policy	Kapil Kesarwani (PI), Surjeet Singh, Lavkush Kumar Patel, DS Bisht, Akshaya Verma, Madhusudan Thapliyal	03 years (04/24-03/27) New	NIH
Sponsored/Collaborative Projects				
1.	Assessment of glacier-climate functional relationships across the Indian Himalayan region through long-term network observations	Vishal Singh, Lead Co-PI, NIH Roorkee	03 years (12/23-11/26) Ongoing	Sponsored by NMHS-GBPNIHE
2.	Satellite based mountain hazard assessment and monitoring (MHAM) in Uttarakhand, joint with IIRS Dehradun – Sponsored by IIRS	Vishal Singh (PI-NIH), RS Chatterjee (Lead PI-IIRS), Praveen K Thakur, Pankaj R. Dhote, NIH Roorkee (PI-NIH) Sanjay K Jain (Ex. Sc., NIH)	01 year (01/23-01/24) Funds Recvd Nov-23. Ongoing	Sponsored by IIRS, Dehradun
Consultancy Studies				
1.	System Studies for Proposed Farakka-Sundarban Link Project	Surjeet Singh (PI), MK Goel, PK Singh, PK Mishra, Vishal Singh, Nitesh Patidar	1.5 years (12/22-05/24) Ongoing	Sponsored by NWDA

ENVIRONMENTAL HYDROLOGY DIVISION

The overview of the technical activities of the Environmental Hydrology Division (EHD) during the year 2023-24 was presented by Dr. R.P. Pandey, Scientist 'G' & Head, EHD. The Working Group was appraised about the scientific manpower, status of completed and ongoing studies, consultancy projects, publications, and technology transfer activities. Subsequently, the scientists of the Division were invited to present the completed studies, progress of ongoing internal studies, and proposed new studies. The Comments/suggestions of Working Group members are summarized below.

Progress of Work Program for 2023-24

S.No.	Study	Recommendations/Comments
Sponsored Projects (Ongoing)		
1.	**Title:** Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS) **Study Group**: Omkar Singh (PI), Rajesh Singh, Jyoti P Patil, VK Tyagi, Kalzang Chhoden, Rajesh Agarwal **Partners:** MNIT-Jaipur, IIT-Bombay, IRMA-Anand **Duration:** 5 Years (04/19-09/24), Sought extn. for 6 months. **Project Cost**: 5.1 Crores **Sponsored by**: DST **Status:** In-progress	Dr. Rajesh Singh presented the progress of the study and the outcomes in the Working Group meeting. The WG members appreciated the outcomes of the study and emphasized the need for such types of studies to deal with the deteriorating water quality of water bodies. The members also visited the experimental sites of the study.
2.	**Title:** Irrigation Efficiency Improvement for Medium Irrigation Project (MIP) Shahnahar, H.P. **Study Group**: R. P. Pandey, (PI), J. P. Patra, Rajesh Singh, Shakti Suryavanshi, SK Kumre **Duration:** 3 Years (12/17-05/23), Further Extension to be Requested due to late installation of field instruments **Project Cost**: 75 Lakh **Sponsored by**: NHP **Status:** In-progress	Dr. R. P. Pandey briefed about the progress of the project and the extension has been requested to the sponsoring agency up to Dec 2024. The PI informed that the title of the project has been revised.
3.	**Title:** Anaerobic co-digestion of wastewater treatment plant sludge and organic fraction of municipal solid waste: Effect of thermal-chemical pretreatment on process performance and microbial community development **Study Group:** Vinay Kumar Tyagi (PI) **Duration:** 5 Years (04/2018 - 03/2023) **Sponsored by**: DBT; **Project Cost:** 106.5 Lakh **Status:** In-progress	Dr. Vinay Tyagi briefed about the progress of the project and the extension has been requested to the sponsoring agency up to Jun 2024.

Collaborative Sponsored Projects (Ongoing)		
4.	**Title:** Isotopic and geochemical approach to study vulnerable confined and unconfined drinking water aquifers in Varanasi and surrounding area, India **Study Group**: Rajesh Singh (PI), R.P. Pandey **Collaborators:** BHU, Varanasi (Lead), BARC, Mumbai, ICER, Hungary. **Duration:** 3 Years (07/21-06/24) **Sponsored by**: BHU; **Status**: In-progress	Dr. Rajesh Singh reported that this study is in progress in collaboration with other institutions.
5.	**Title:** SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resources recovery for India **Study Group:** Vinay Kumar Tyagi (Co-PI) A.A.Kazmi (PI, IITR) **Duration:** 4 Years (03/20-06/24); **Sponsored by:** DST **Project Cost:** 175.0 Lakh; **Status:** In-progress	Dr. Vinay Tyagi briefed about the progress of the project.
6.	**Title:** Comprehensive characterization of variably processed sewage sludge in Ganga basin to classify its suitability for safe disposal **Study Group:** Vinay Kumar Tyagi (Co-PI), A.A.Kazmi (PI, IITR) **Duration:** 02 Years (01/22-03/24) **Sponsored by**: CPCB & NMCG; **Status:** In-progress	Dr. Vinay Tyagi briefed about the progress of the project.
Internal Study (Ongoing)		
7.	**Title:** Characterization of Groundwater Dynamics in Krishna-Godavari Delta interims using groundwater levels, Hydrochemistry, Isotopes and Emerging Contaminants **Study Group:** M. K. Sharma, (PI), Suhas Khobragade, Rajesh Singh **Duration:** 2 Years (04/22-03-24) **Status:** In-progress	Dr. M. K. Sharma presented the progress and the findings of the study. The members appreciated the work. Dr. S Grewal suggested to share the findings of the study with the stakeholder (farmers etc.) to realize the ground level scenario of water pollution. Dr. Sharma informed that after report submission, a workshop is planned for sharing the findings with stakeholders.
8.	**Title:** Understanding Arsenic mobilization in groundwater of Haridwar and formulating remediation measures **Study Group:** Rajesh Singh (PI), R. P. Pandey, Sumant Kumar, Pradeep Kumar, M. K. Sharma, V. K. Tyagi, Kalzang Chhoden	Dr. Rajesh Singh presented the progress of the study. Members made following suggestions: 1. Dr. Sudhindra Mohan Sharma, Ex-Nodal Officer, MoDWS, Indore suggested correlating As concentration with the drainage of the study area.

	Duration: 3 Years (07/21 – 06/24), **1 Year extension was requested by PI** **Project Cost:** 30.1 Lakh **Status:** In-progress	2. Dr. Bhishm Kumar, IAEA (Retd.) suggested isotope analysis to understand the recharge in the aquifers. 3. Dr. Samuel suggested to consider remediation of As through ex-situ treatment or others.
9.	**Title:** Simulation of Non-Point Source Pollution Processes in Song River **Study Group:** Pradeep Kumar, (PI), M.K. Sharma, Rajesh Singh **Duration:** 4 Years (11/19-10/23) **Extension up to Jun 2024 for submission of report** **Status:** In-progress	Dr. Pradeep Kumar presented the progress and the findings of the study. The PI requested to grant extension up to June 2024 for report submission to include the outcome of village level surveys.
10.	**Title:** Hydrological Studies for the Conservation of Rewalsar Lake **Study Group:** Kalzang Chhoden (PI), Rajesh Singh, R. P. Pandey, Pradeep Kumar, Vinay Kumar Tyagi, Omkar Singh, Suhas Khobragade, D.S. Malik (GKU, Haridwar) Collaborator: HPSWA, Shimla **Duration:** 3 Years (04/23-03/26) **Project Cost:** 53.16 Lakhs **Status:** In-progress	Dr. Rajesh Singh presented the progress of the study and future planned activities. There were no specific comments /suggestions.
11.	**Title:** Comprehensive evaluation of disinfection units of STPs in Ganga basin: Formation & Control of emerging oxidation precursors. **Study Group:** Vinay Kumar Tyagi (PI), Rajesh Singh, Mukesh K. Sharma, Pradeep Kumar, J. P. Patra, Kalzang Chhoden, R.P.Pandey (NIH) Bhanu P Vellanki and A.A Kazmi (IITR) **Duration: 3** Years (04/2023 – 03/2026) **Project Cost:** 73.66 Lakh **Status:** In-progress	Dr. V. K. Tyagi presented the progress of the study and future planned activities.
Proposed New Studies (Internal)		
12.	**Title:** Nanotechnology-enabled Multifunctional Materials for the Detection and Remediation of Arsenic in Contaminated Water **Study Group**: Prasanta Kumar Sahoo (PI), R. P. Pandey, M. K. Sharma, Rajesh Singh, Pradeep Kumar, Vinay Kumar Tyagi, Kalzang Chhoden, Sumant Kumar **Duration:** 3 Years (04/24-03/27) **Project Cost**: 73.7 Lakh **Status:** Proposed	Dr. Prasanta Kumar Sahoo presented the proposed plan of study to the Working group. The members agreed on the objectives and requirements of the suggested study and appreciated the proposed work. There were no specific comments /suggestions.

13.	**Title:** Land and water management plan for rejuvenation of river Tilodki Ganga, Ayodhya **Study Group**: Dr. Shakti Suryavanshi, Dr. Shailendra K. Kumre, Dr. R. P. Pandey, Dr. Pradeep Kumar, Dr. Rajesh Singh, Dr. M. K. Sharma, Dr. Kalzang Chhoden, Dr. Nitesh Patidar, Dr. V. K. Tyagi **Duration:** 3 Years (04/24-03/27) **Project Cost**: 36.6 lakh **Status:** Proposed	Dr. Shakti Suryavanshi presented the proposed plan of study to the Working group. The members suggested to share the results of study with implementation agency for its practical utility. The title of the study is proposed to be modified as "Land and Water Management Plan for Rejuvenation of River Manorama".
14.	**Title:** Groundwater Quality Assessment of Tripura with Special Reference to Arsenic and Fluoride **Study Group:** Rajesh Singh (PI), V. K. Tyagi, M. K. Sharma, P. K. Sahoo, Kalzang Chhoden, S. Suryavanshi NIH-NERC: Sanjay K. Sharma, S. Barman, W. R. Singh TSPCB, Tripura: Rajib Paul **Duration:** 3 Years (05/2024 – 04/2027) **Project Cost:** 33.8 Lakh **Status:** Proposed	Dr. Rajesh Singh presented the proposed plan of study. The Working Group agreed on the objectives and need of the proposed study. Dr. Bhism Kumar, IAEA (Retd.) and Dr. Manoj P. Samuel, CWRDM, Kozhikode suggested to include solutions for As and F removal in the objective.
15.	**Title:** Comprehensive Hydrological Study for River Health Assessment and Development of Environmental Management Plan for River Yamuna **Study Group:** Pradeep Kumar (Lead-PI) and team of scientists from EHD, GWHD & HI **Duration:** 5 Years (05/2024 – 03/2029) **Project Cost:** 538.7 Lakh **Status:** Proposed	Dr. Pradeep Kumar presented the proposed plan of activities for the study. The members appreciated the work proposed to be undertaken and suggested to include CGWB, CWC, Yamuna Basin Organization (YBO) and the Stakeholder State Departments also.

Recommended Work Programme for the Year 2024-25

S. No.	Study Title	Study Team	Duration/Status
Sponsored R&D Projects (Ongoing)			
1.	Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)	Omkar Singh (PI), Rajesh Singh (Co-PI), Jyoti P Patil, VK Tyagi, Kalzang Chhoden, Rajesh Agarwal **Partners:** NIH, MNIT-Jaipur, IIT-Bombay, IRMA-Anand	5 Years (04/19 - 09/24) Sought extn. for 6 months. **Project Cost**: 5.1 Crore **Sponsored by:** DST **Status:** In-progress
2.	Irrigation Efficiency Improvement for Medium Irrigation Project (MIP) Shahnehar, H.P.	RP Pandey (PI), J P Patra, Rajesh Singh, Shakti Suryavanshi, SK Kumre, NK Bhatnagar	12/17 - 06/24 **Project Cost**: 75 Lakh **Sponsored by:** NHP **Status:** In-progress
3.	Anaerobic Co-digestion of Thermochemically Pretreated Organic Fraction of Municipal Solid Waste and Sewage Sludge: Effect on Process Performance and Microbial Community Development	Vinay Kumar Tyagi (PI)	6 Years (2018-2024) **Project Cost**: 106 Lakhs **Sponsored by**: DBT **Status**: In-progress
Collaborative R&D Projects (Ongoing)			
4.	Isotopic and geochemical approach to study vulnerable confined and unconfined drinking water aquifers in Varanasi and surrounding area, India	Rajesh Singh (PI), R.P. Pandey BHU, Varanasi (Lead) Other Collaborators: BARC, Mumbai, ICER, Hungary	3 Years (07/21-06/24) **Sponsored by**: BHU **Status**: In-progress
5.	Comprehensive characterization of variably processed sewage sludge in Ganga basin to classify its suitability for safe disposal	VK Tyagi, (Co-PI) AA Kazmi (PI, IITR)	02 Years (01/22-06/24) **Sponsored by**: Central Pollution Control Board (CPCB)-NMCG **Status**: In-progress
6.	SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resources recovery for India	VK Tyagi, (Co-PI) AA Kazmi (PI, IITR)	4 Years (03/20-06/24) **Sponsored by**: DST **Status**: In-progress
Internal Study (Ongoing)			
7.	Characterisation of Groundwater Dynamics in Krishna-Godavari Delta interims using groundwater levels, Hydrochemistry, Isotopes and Emerging Contaminants	MK Sharma (PI), Suhas Khobragade, Rajesh Singh	2 Years (04/22-06/24) **Status:** In-progress
8.	Understanding arsenic mobilization in groundwater of Haridwar and formulating remediation measures	Rajesh Singh (PI), RP Pandey, Sumant Kumar, Pradeep Kumar, MK Sharma, VK Tyagi, Kalzang Chhoden	3 Years (07/21-06/24) **Status:** In-progress

9.	Simulation of Non-Point Source Pollution Processes in Song River	Pradeep Kumar (PI), MK Sharma, Rajesh Singh	4 Years (11/19-06/24) **Status:** In-progress
10.	Hydrological Studies for the Conservation of Rewalsar Lake	Kalzang Chhoden (PI) Rajesh Singh, RP Pandey, P Kumar, VK Tyagi, Omkar Singh, Suhas Khobragade, DS Malik, GKU, Haridwar	3 Years (12/22-11/25) **Status:** In-Progress
11.	Comprehensive evaluation of disinfection units of STPs in Ganga basin: Occurrence and control formation of emerging oxidation precursors	VK Tyagi (PI), Rajesh Singh, MK Sharma, P Kumar, JP Patra, Kalzang Chhoden, RP Pandey	3 Years (04/23 - 03/26) **Status:** In-Progress
Internal Study (New)			
12.	Nano-technology-enabled Multifunctional Materials for the Detection and Remediation of Arsenic in Contaminated Water	PK Sahoo (PI), Rajesh Singh, RP Pandey, MK Sharma, Pradeep Kumar, VK Tyagi, Sumant Kumar, Kalzang Chhoden	3 Years (04/24 - 03/27)
13.	Land and water management plan for rejuvenation of Manorama River	Shakti Suryavanshi (PI), SK Kumre, RP Pandey, Pradeep Kumar, Rajesh Singh, MK Sharma, VK Tyagi	3 Years (04/24 - 03/27)
14.	Groundwater Quality Assessment of Tripura with Special Reference to Arsenic and Fluoride	Rajesh Singh (PI), VK Tyagi, MK Sharma, PK Sahoo, Kalzang Chhoden, Shakti Suryavanshi, S.K. Sharma, Swapnali Barman, WR Singh, Rajib Paul (TSPCB)	3 Years (04/24 - 03/27)
15.	Comprehensive Hydrological Study for River Health Assessment and Development of Environmental Management Plan for River Yamuna	Pradeep Kumar (Lead-PI) and team of scientists from EHD, GWHD & HI	5 Years (04/24 - 03/29)
Consultancy Projects (Ongoing)			
16.	Water Quality Studies for Tehri Reservoir Tehri HPP (4x250MW)	Sudhir Kumar, RP Pandey, MK Sharma (PI), P Kumar, Rajesh Singh, SK Kumre	2 Years (02/23-01/25) **Funded by:** THDC, India Limited **Cost:** Rs. 6.91 Lakh **Status:** In-Progress
17.	Preparation of District/State Action Plans for Source Sustainability of Drinking Water Supply Schemes under Jal Jeevan Mission, Uttarakhand	RP Pandey (PI), Rajesh Singh (Co-PI), P Kumar, MK Sharma, VK Tyagi, Kalzang Chhoden, PK Sahoo, Shakti Suryavanshi, Shailendra Kumre	08 Months (10/23-06/24) **Funded by:** Uttarakhand Jal Jeevan Mission **Cost:** Rs. 1.06 Crore **Status:** In-Progress

GROUNDWATER HYDROLOGY DIVISION

Dr. Anupma Sharma, Scientist-G and Head, Groundwater Hydrology Division made a brief presentation about the present manpower of the division and attached Soil-Water Laboratory, thrust areas of the division, work program and major achievements during the year 2023-24, and the proposed work program for the year 2024-25. It was informed that in addition to progress in various studies and sponsored projects, work on the development of two software has continued, one patent has been awarded and five new internal studies have been planned. It was reported that a major project on Luni River basin is proposed to be undertaken. Subsequently, detailed presentations on various studies were made by the respective Scientists (PIs) of various studies. Sponsored studies were not presented. The recommendations/ comments of the Working Group members on these studies are summarized below.

Progress of Work Program for the Year 2023-24

S. No.	Title of Project/Study	Recommendations/Comments
Internal Studies (Ongoing)		
1. NIH/GWH/22-24	Conjunctive Management of Water Resources in IGNP Command	Dr. S.M. Sharma appreciated the work and suggested exploring the relationship between the waterlogged area and the area under the Kharif crops. PI agreed to the suggestion. Further, Dr. S.M. Sharma asked about the groundwater salinity in the IGNP and PI responded to the queries. WG members approved extension of study till May 2024.
2. NIH/GWH/23-24	Development of Archive of Soil Hydraulic Characteristics	On request, WG members approved extension of study till Sept. 2024. No other specific comments were received from the members.
3. NIH/GWH/23-25	Enhancement and application of NIH_WISDOM	No specific comments were received from the members.
4. NIH/GWH/22-25	Studying arsenic genesis and developing alternate water supply management strategies in the Ganga basin	The members suggested that instead of one-time sampling for water quality analysis, both pre & post-monsoon sampling should be carried out for better interpretation of the results. It was also suggested that a re-analysis of some samples may be done to double-check the results. PI agreed to the suggestion.
Sponsored Projects (Ongoing)		
5. NIH/GWH/CEHM/18-22	Integrated Management of Water Resources for Quantity and Quality in Upper Yamuna Basin up to Delhi	Not presented due to time constraints as they are the sponsored research projects
6. NIH/GWH/DST/19-23	Enhancing Food and Water Security in Arid Regions Through Improved Understanding of Quantity,	Not presented due to time constraints as they are the sponsored research projects

	Quality, and Management of Blue, Green, and Grey Water	
Sponsored Projects (New)		
7. NIH/GWH/DST-SERB/ 23-25	Use of deep learning models to understand the impact of climate and land use changes on future groundwater resources, with a focus on data scarce regions.	Not presented due to time constraints as they are the sponsored research projects
8. NIH/GWH/MoES/ 22-24	Carriers of Mass Transport Contamination in Delhi, NCR	Not presented due to time constraints as they are the sponsored research projects
Internal Studies (New)		
Major Project with Sub-Projects from S. No. 9-12	Enhancing the Sustainability of Water Resources Through Integrated Assessment and Management Techniques in the LUNI River Basin – Rajasthan	No specific comments were received from the members.
9. NIH/GWH/24-27	Hydrogeochemical Evolution and role of Paleochannels on groundwater quality in the Luni Basin	The members suggested to consider the geomorphology of the study area for understanding the recharge process and subsequent groundwater management.
10. NIH/GWH/ 24-26	Estimation of Soil Characteristics and Simulation of Groundwater Recharge in the Luni River Basin	Dr. S. M. Sharma raised concern over the depth of vadose zone, target zones for recharge, and different modeling techniques for recharge estimation. He suggested using an alternative word for 'groundwater recharge' in the title which was agreed by PI.
11. NIH/GWH/ 24-26	Hydrogeological Investigations in the Luni River Basin	No specific comments were received from the members
12. NIH/GWH / 24-27	Characterization and Modeling of Multi Aquifer System of LUNI River Basin in Rajasthan Under Climate and Anthropogenic Influences	No specific comments were received from the members
13. NIH/GWH/24-27	Surface water - groundwater interactions through field techniques and hydrological modelling in Yamuna basin	Members suggested that Dr. Soumyaranjan Sahoo from Surface water Hydrology Division may be included in the team.

Recommended Work Programme for the Year 2024-25

S. No.	Project	Project Team	Duration	Funding
Internal Studies (Ongoing)				
NIH/GWH/22-25	Studying arsenic genesis and developing alternate water supply management strategies in Ganga basin	Sumant Kumar (PI), Surjeet Singh, Nitesh Patidar, Rajesh Singh, Gopal Krishan, M.K. Sharma, Vinay Tyagi,	3 years (04/22 – 03/25) Status: **In-progress**	Internal Study

		Soban Singh Rawat, P.K. Mishra		
NIH/GWH/22-24	Conjunctive Management of Water Resources in IGNP Command	Nitesh Patidar (PI), M. K. Goel, Anupma Sharma, Surjeet Singh, Gopal Krishan, Sumant Kumar	2 years (04/22 – 3/24) **In-progress** ext. till May 2024	Internal Study
NIH/GWH/23-24	Development of Archive of Soil Hydraulic Characteristics	Nitesh Patidar (PI), Surjeet Singh, M.K. Goel, Anupma Sharma	1 year (04/23 – 03/24) Status: **In-progress** ext. till Sept. 2024	Internal Study
NIH/GWH/23-25	Enhancement and application of NIH_WISDOM	Nitesh Patidar (PI) Deepak Singh Bisht, M.K. Goel, T. Thomas, Sunil Gurrapu, Anupma Sharma, Surjeet Singh	2 years (10/23 – 09/25) Status: **In-progress**	Internal Study
Sponsored Projects (Ongoing)				
NIH/GWH/DST/19-23	Enhancing Food and Water Security in Arid Region through Improved Understanding of Quantity, Quality and Management of Blue, Green and Grey Water	Anupma Sharma (PI-NIH), Gopal Krishan, Nitesh Patidar, P.K. Mishra (*Lead*: CAZRI Jodhpur, *Partners*: NIH, IISWC Dehradun, CSWRI & CIAH, Bikaner, NIAM Jaipur)	5 years (03/19 - 07/24) Status: **In progress**	DST
Sponsored Projects (New)				
1. NIH/GWH/ DST-SERB/23-25	Use of deep learning models to understand the impact of climate and land use changes on future groundwater resources, with focus on data scarce regions.	L. Surinaidu (PI-NIH) (Lead: IIT Hyderabad, Partner: McGill University, Canada)	2 years 06/23-07/25 **Status: New Study** Transferred to NIH from NGRI	DST-SERB
NIH/GWH/MoES/22-24	Carriers of Mass Transport Contamination in Delhi, NCR	L. Surinaidu (PI-NIH) (Lead: NGRI, Hyderabad)	2 years 10/22-09/24 Status: **New** Transferred from NGRI	MoES
Internal Studies (New)				
NIH/GWH/24-27	Surface water-groundwater interactions through field techniques and hydrological modelling in Yamuna basin	Sumant Kumar (PI), Nitesh Patidar, L. Surinaidu, Pintu Gupta, Ajit Kumar Behera, Anupma Sharma, Shailendra Kumre, Gopal Krishan	3 years (04/24 – 03/27) Status: **New Study**	Internal Study

roject with sub-projects (S.N. 2-5)	Enhancing Sustainability of Water Resources Through Integrated Assessment and Management Techniques in the LUNI River Basin – Rajasthan	Anupma Sharma (Project Coordinator) Scientists from GWH Div. & NWRC Jodhpur	3 years (04/24 – 03/27) Status: **New Study**	Internal Study
NIH/GWH / 24-26	Estimation of Soil Characteristics and Simulation of Groundwater Recharge in the Luni River Basin	Satendra Kumar (PI) Anupma Sharma, L. Surinaidu, Ajit K. Behera, Pintu K. Gupta, Nitesh Patidar	2 years (04/24 – 03/26) Status: **New Study**	Internal Study
NIH/GWH/24-27	Hydrogeochemical Evolution and role of Paleochannels on groundwater quality in the Luni Basin	Ajit Kumar Behera (PI), L. Surinaidu, Pintu Gupta, Malkhan Singh Jatav, Anupma Sharma, M. K. Sharma, Dr. A. H. Laskar (PRL)	3 years (04/24 – 03/27) Status: **New Study**	Internal Study
NIH/GWH/24-26	Hydrogeological Investigations in the Luni River Basin	Pintu Kumar Gupta (PI), L. Surinaidu, Nitesh Patidar, Ajit Kumar Behera, Satendra Kumar, Sudesh Chaudhary	2 years (04/24 – 03/26) **Status: New Study**	Internal Study
NIH/GWH/24-27	Characterization and Modeling of Multi Aquifer System of Luni River Basin in Rajasthan Under Climate and Anthropogenic Influences	L. Surinaidu (PI), Anupma Sharma, Ajit K. Behera Sumant Kumar, Sudesh Chaudhary	3 years (04/24 – 03/27) **Status: New Study**	Internal Study

HYDROLOGICAL INVESTIGATIONS DIVISION

Dr Suhas Khobragade, Scientist-G and Head of the H. I. Division presented the brief details of the Division including the scientific staff strength and infrastructure. He briefly introduced about the scientific work of the Division and the various studies being carried by the Division, along with details about the publications by the Division and analytical work carried out at the Nuclear Hydrology Laboratory. He also informed about the technology transfer activities organized/proposed by the Division during 2022-23. The progress of each individual study for the year 2023-24 and the proposal for the new studies was presented by the respective P.I. of the study. The comments/actions suggested by the working group for various studies are given in Table below.

Progress of Work Program for the Year 2023-24

S. No.	TITLE OF STUDY	COMMENTS/SUGGESTIONS
Work Programme of 2023-24		
1.	Hydrogeological and Isotopic investigation of groundwater in Himalayan Watershed of Kashmir, India	Dr. Bhishm Kumar suggested to prepare d-excess plots and include in final report.
2.	Assessment of the Possible Impact of Climate Change on Evapotranspiration for Different Climatic Regions of India	Not presented
3.	Runoff and Water Storage Capacity Estimation Using Different Resolutions of Topographic Data for Deciding Rainwater Harvesting Strategies	Chairman, WG suggested modifying the title to "Runoff and Water Storage Capacity Estimation for Deciding Rainwater Harvesting Strategies"
4.	Sedimentation and Water Quality Study of Fulhar Lake, Pilibhit (U.P.)	Not presented
5.	Developing a Stable Isotopic Analysis System for Analyzing the Dissolved Nitrates in Water	Dr. Someshwar Rao informed that conducting a ^{15}N analysis using an online analysis system with the necessary Isotope Ratio Mass Spectrometry (IRMS) instrument may exceed a cost of Rs 4.5 crores. Due to the substantial budget, it is proposed to drop this project. In response, Dr. Bhishm Kumar recommended not to drop the project but to continue it by adopting an offline sample preparation technique, which is not only cost-effective but is also employed at various laboratories of repute. Dr. Bhishm Kumar also expressed his willingness to provide technical support for the development of such an offline system.
6.	Groundwater Fluctuations and Conductivity Monitoring in Punjab - Groundwater	No specific comments/suggestions.

	resilience in Punjab and adaptation to future changes in climate and water resource demands *(*title modified by funding agency*)*	
7.	Expansion of the Indo-German Competence Centre for Riverbank Filtration – CCRBF	No specific comments/suggestions.
8.	Partitioning Evapotranspiration into Evaporation and Transpiration fluxes using Stable Isotopes of Oxygen and Hydrogen	No specific comments/suggestions.
9.	ng The Fate of The Hindon River By Evaluating The Impact Of Agriculture On The Water Balance: Developing a Template for a Cleaner Ganga River	Not presented
Proposed New Studies for 2024-25		
1.	Development of radiocarbon dating facility	Dr. Bhishm Kumar suggested that Benzene line may also be prepared to explore groundwater age dating up to 50k yrs.
2.	Understanding Surface Water Groundwater Interactions in the Narmada River Basin and its Hydrological Implications	Chairman, WG suggested to discuss the study with NCA and Bhopal RC. Dr Bhishm Kumar suggested to include the Bhopal regional center and the state groundwater department in this study. Sh. Sudhindra Mohan Sharma suggested to carry out this study with more focus on factors controlling the base flow in the Narmada River basin.
3.	Hydrological and hydrogeological investigations in the Yamuna river basin using isotope techniques	No specific comments/suggestions.
4.	Fingerprinting of aquifer dynamics in India through isotopic and geochemical approach: demand driven investigations at regional scale under NAQUIM 2.0	No specific comments/suggestions.
5.	Quantifying Current and Future Meteorological Drought Characteristics and Identifying Risk Zones in Central India	Chairman, WG suggested to carry out the study for Uttar Pradesh region of Yamuna basin also. He also suggested to add an expert from Bhopal RC in the study Dr. Surjeet Singh, Sc-G and Head C4S, suggested to look into the work already done by Bhopal RC Dr. Grewal suggested to review the work done by various agricultural universities and other departments of the state

Recommended Work Programme for the Year 2024-25

S. No.	Project Title	Study Team	Duration	Status
INTERNAL STUDIES				
1.	Assessment of the Possible Impact of Climate Change on Evapotranspiration for Different Climatic Regions of India	SD Khobragade (PI), Vishal Singh	3 years (04/22-03/25)	On-going
2.	Runoff and Water Storage Capacity Estimation for Deciding Rainwater Harvesting Strategies	Dr. S.M. Pingale(PI) Dr. Soban Singh Rawat, Dr. S. D. Khobragade Sh. Rajeev Gupta	2 Years (04/23-03/25)	On-going
3.	Sedimentation and Water Quality Study of Fulhar Lake, Pilibhit (U.P.)	Sh. Rajeev Gupta (PI), Dr. S.D. Khobragade Dr. S.M. Pingale	2 Years (04/23-03/25)	On-going
4.	Development of radiocarbon dating facility	Dr. Tripti Muguli (PI) Dr. Someshwar Rao, Dr. Amit Pandey	1 year (04/24-04/25)	**New Study**
5.	Understanding Surface Water Groundwater Interactions in the Narmada River Basin and its Hydrological Implications	Dr. Amit Pandey (PI) Dr. S. D. Khobragade, Dr. Someshwar Rao Dr. Tripti Muguli	3 years (04/24-03/27)	**New Study**
6	Hydrological and hydrogeological investigations in the Yamuna River basin using isotope techniques.	Dr. Tripti Muguli (Project Coordinator), Dr. Suhas Khobragade, Dr. Someshwar Rao Sh. Ruchir Patidar, Sh. Vipin Agrawal, Dr. Amit Pandey	3 years (04/24-03/27)	**New Study**
7	Fingerprinting of aquifer dynamics in India through isotopic and geochemical approach: demand driven investigations at regional scale under NAQUIM 2.0	Dr. Tripti Muguli (PI), Dr. S.D. Khobragade	3 years (04/24-03/27)	**New Study**
8.	Quantifying Current and Future Meteorological Drought Characteristics and Identifying Risk Zones in Central India.	Sh. Ruchir Patidar (PI), Dr. S.M. Pingale, Dr. S.D. Khobragade	3 years (04/24-03/27	**New Study**
SPONSORED PROJECTS				
1.	Groundwater Fluctuations and Conductivity Monitoring in Punjab - Groundwater resilience in Punjab and adaptation to future changes in climate and water resource demands *(*title modified by funding agency*)*	Dr. Gopal Krishan (PI), Dr. S. Singh, Dr. M. S. Rao *BGS, UK:* Dr. Dan Lapworth Dr. Alan MacDonald Dr. Daren Goody	7 years (12/17-11/24)	On-going

S. No.	Project Title	Study Team	Duration	Status
2.	Expansion of the Indo-German Competence Centre for Riverbank Filtration – CCRBF	Dr. Gopal Krishan (PI & Co-coordinator) Federal Min. of Education and Research, Germany	(07/20 – 03/24) (likely to be extended further)	On-going
3.	Partitioning Evapotranspiration into Evaporation and Transpiration fluxes using Stable Isotopes of Oxygen and Hydrogen	Dr. Gopal Krishan (PI), Dr. MS Rao DST-SERB	04/21 – 03/24 (likely to be extended up to 10/2024)	On-going
4.	ıg The Fate of the Hindon River by Evaluating The Impact Of Agriculture On The Water Balance: Developing a Template for a Cleaner Ganga River	Dr. M. K. Sharma (**PI**) Ms. Anjali Dr. Vishal Singh Dr. SM Pingale, Dr. S.D. Khobragade Dr. Pradeep Kumar, Dr. Nitesh Patidar, Dr. Surjeet Singh.	5 years (04/22-03/27)	On-going

SURFACE WATER HYDROLOGY DIVISION

Dr. A.K. Lohani, Sc G & Head, Surface Water Hydrology Division presented various activities of the division. The number of research papers published in various journals, lectures delivered in various training courses and number of M.Tech./Ph.D. students guided/under guidance during the period were also reported. The concerned PI of the study presented the progress of his/ her completed and new internal studies during the working group meeting. The record of discussions for the respective study is given below:

Progress of Work Program for the Year 2023-24

S. No.	Title of Project/Study	Recommendations/Suggestions
Internal Studies (Completed)		
1.	Development of Cloud Data Based Integrated Framework to Forecast Flood for Efficient Operation of Reservoirs	Completed. No specific action suggested.
2.	Hydraulic force-inversion equation for exact modeling of hydraulic jumps in rectangular channels	Completed. There were no specific comments from the members on the study.
Internal Studies (Ongoing)		
1.	Flood Forecasting under Changing Climate Conditions - Role of Machine Learning and Conceptual/Physical based Model	No specific action was suggested.
2.	Hydrological Study for revival and restoration of traditional water bodies in Bikaner, Rajasthan	No specific action was suggested.
3.	Review of design flood and dam break analysis of Khadakhai Dam in Odisha	No specific action was suggested.
4.	Investigation on occurrences of seasonal extremes across Northwest Himalaya in relation to global atmospheric thermal and circulation changes	Transferred to C4S.
5.	Investigating gap areas, current trends and future directions of research in Climate Change Impact on Hydrology and Water Resources in India through Scientometrics.	Transferred to WRSD.
6.	Investigation of hydrodynamic approach of flood inundation mapping along with assessment of changes in river planforms using a cloud-based Google Earth Engine (GEE) computing platform in data-scarce Western Himalayan River basin	No specific action was suggested.
7.	Estimation of confidence intervals of index flow duration curves	No specific action was suggested.
8.	Hydrologic and hydraulic study for Jata Ganga river at Jageshwar dham	No specific action was suggested.
Sponsored Projects (Ongoing)		
1.	Operational coastal flood management through short-to-medium range (real-time) flood vulnerability mapping in the Brahmani-Baitarani	The study was presented by PI. There were no specific comments from the members on the study.

	River Basin integrating human and climate induced impacts	
Internal studies (New)		
1.	Entropy and Image Processing Based Non-Contact Discharge Monitoring Techniques: Testing and Implementation for Indian rivers	PI presented the objectives and scope of the proposed study. There were no specific suggestions/comments from the members.
2.	A Flood Forecasting Framework Coupling a High Resolution WRF Ensemble with 2D Hydrodynamics Model for Himalayan Mountainous Area.	PI presented the objectives and scope of the proposed study. There were no specific suggestions/comments from the members.
3.	Basin-scale, integrated water resources assessment through integrated hydrological modelling	PI presented the objectives and deliverables of the proposed study. Suggestion from Dr. Praveen K. Thakur (member WG) were to include: i) Soil moisture data from Bhoonidhi; ii) An objective on satellite data assimilation.
4.	Comprehensive Mapping of Water Budget Dynamics and Reservoir Sedimentation in the Upper Krishna Basin using Google Earth Engine.	PI presented the objectives and deliverables of the proposed study. Dr. Praveen Thakur suggested to include SWOT mission data in the present study.
5.	Water Resources Planning and Management using DSS (PM) under Changing Climatic and Land-Use Conditions	PI presented the objectives and deliverables of the proposed study. Dr. Praveen Thakur suggested include Cartosat data for DEM generation.
6.	Web based platform for IDF Design Rainfall Estimates for India	PI presented the objectives and deliverables of the proposed study. Dr. Praveen Thakur suggested to use the word 'curve' instead of 'depth' and to incorporate PMP Atlas data in database.

Recommended Work Programme for the Year 2024-25

S. No.	Title of Project/Study	Study Team	Duration	Funding
Internal studies (Ongoing)				
1.	Flood Forecasting under Changing Climate Conditions - Role of Machine Learning and Conceptual/Physical based Model	P. C. Nayak; A. K. Lohani; J. P. Patra; Sunil Gurrapu; T. Thomas; Om Prakash; Jatin Malhotra	03 Year (July 2022 - June 2025)	NIH
2.	Hydrological Study for revival and restoration of traditional water bodies in Bikaner, Rajasthan	L. N. Thakural; J. P. Patra; M. K. Sharma; R. K. Jaiswal; P. K. Mishra; Nitesh Patidar; N. K. Bhatnagar; Jatin Malhotra; Anil Kumar Chhangani	02 Year (Apr 2022 - June 2024) (Extension required for Six months)	NIH
3.	Review of design flood and dam break analysis of Khadakhai Dam in Odisha	J.P. Patra; A. K. Lohani; Pankaj Mani; P. C. Nayak	03 Year (April 2022 - March 2025)	NIH

		Sanjay Kumar		
4.	Investigation of hydrodynamic approach of flood inundation mapping along with assessment of changes in river planforms using a cloud-based Google Earth Engine (GEE) computing platform in data-scarce Western Himalayan River basin	R. V. Kale; A. K. Lohani J. P. Patra; D. Khurana	03 Years (September 2021- October 2024)	NIH
5.	Estimation of confidence intervals of index flow duration curves	Sanjay Kumar; Sunil Gurrapu; L. N. Thakural J. P Patra	02 Years (April 2023 - March 2025)	NIH
6.	Hydrologic and hydraulic study for Jata Ganga river at Jageshwar dham	J.P. Patra; A. K. Lohani; Pankaj Mani; D. S Bisht; S. S. Rawat	01 Years (July 2023 - July 2024)	NIH
Sponsored Projects (Ongoing)				
1.	Operational coastal flood management through short-to-medium range (real-time) flood vulnerability mapping in the Brahmani-Baitarani River Basin integrating human and climate induced impacts	B. Sahoo (PI, IIT-Kgp), R. V. Kale, (Co-PI)	04 years (July, 2020 – June, 2024)	STARS (MHRD, GoI)
Internal studies (proposed)				
1.	Entropy and Image Processing Based Non-Contact Discharge Monitoring Techniques: Testing and Implementation for Indian rivers	NIH: R, V, Kale; M. K. Goel; A. K. Lohani CWPRS: Dr. Selva Balan External Expert: Prof. M. Perumal	1.5 Years (April 2024 - September 2025)	NIH
2.	A Flood Forecasting Framework Coupling a High Resolution WRF Ensemble with 2D Hydrodynamics Model for Himalayan Mountainous Area.	R. V. Kale; K. Sharma; S. Kumar; A. K. Lohani	03 Year (April 2024 - March 2027)	NIH
3.	Basin-scale, integrated water resources assessment through integrated hydrological modelling.	S. Sahoo; A. K, Lohani; P. C. Nayak; R. V. Kale; J. P. Patra	2.5 Years (April 2024 - September 2026)	NIH
4.	Comprehensive Mapping of Water Budget Dynamics and Reservoir Sedimentation in the Upper Krishna Basin using Google Earth Engine.	Chandra Prakash; A. K. Lohani; R. V. Kale; Richa Pandey	02 Years (April 2024 - March 2026)	NIH
5.	Water Resources Planning and Management using DSS (PM) under Changing Climatic and Land-Use Conditions	Richa Pandey, Chandra Prakash, Sukant Jain, J. P. Patra, R. K. Jaiswal, A. K. Lohani	02 Years (April 2024 - March 2026)	NIH
6.	Web based platform for IDF Design Rainfall Estimates for India	Sukant Jain; A. K. Lohani; J. P. Patra; Richa Pandey; Chandra Prakash	1.5 Years (April 2024 - September 2025)	NIH

WATER RESOURCES SYSTEMS DIVISION

Dr. A. R. Senthil Kumar, Sc. G and Head, presented an overview of the division – work force, vision and missions, major research outputs, research and training facilities, the ongoing and new sponsored and internal studies, training courses and outreach activities organized and upcoming training calendar. Thereafter, individual studies were presented by the respective PIs as given below:

Progress of Work Program for the Year 2023-24

S. No.	Title of Project/Study	Recommendations/ Suggestions
	Ongoing Sponsored/ Internal Studies	
1.	Snow and glacier contribution and impact of climate change in Teesta river basin in Eastern Himalaya **Team:** P K Singh; Vishal Singh; A K Lohani **Duration:** 3 years (11/19-11/22), Extended up to 03/24 **Funding:** NMHS-MoEF (143)	Not presented due to time constraints as they are the sponsored research projects
2.	Development of Water Accounts for the different sub-basins of Brahmaputra and Barak River Basins in the state of Meghalaya Using Water Accounting Plus (WA+) Framework. **Team:** P K Singh; P K Mishra **Duration:** 2 years (08/20-07/22), Extended up to 03/24 **Funding:** NHP (14.50)	Not presented due to time constraints as they are the sponsored research projects
3.	Monitoring and hydrological modeling of Henval watershed in Lesser Himalaya **Team:** M K Nema; P K Mishra **Duration:** 3.5 years (08/20-03/24) **Funding:** NIH (10.22)	Not presented due to time constraints
4.	Development of Water Accounts for the selected sub-basins of Brahmaputra, Barak and Irrawady-Chindwin basins in the state of Nagaland using Water Accounting Plus (WA+) Framework. **Team:** P K Mishra; P K Singh **Duration:** 2 years (04/21-06/23), Extended up to 03/24 **Funding:** NHP (9.00)	Not presented due to time constraints as they are the sponsored research projects
5.	Hydrological Assessment of Ungauged Basins (Aghanashini, Dasanakatte, Sita Nadi, Madisala Hole, Swarna Nadi and Gurupur River Basins) of the West Flowing Rivers in the Western Ghat Region of Karnataka **Team:** P K Singh; Vishal Singh; Harsh Upadhyay; Abhilash R. **Duration:** 3 years (04/22-03/25) **Funding:** NHP (54.0)	Dr. P K Singh presented the progress of the study. No specific comments/ suggestions were received.

6.	Spatio-temporal Water Availability under Changing Climate and Land-use Scenarios in Wainganga River Basin **Team:** M K Nema; P K Mishra **Duration:** 3 years (04/22-03/25) **Funding:** NIH (9.72)	Dr. M K Nema presented the progress of the study and informed that various Hydro-met, future climatic and other related data have been collected and preliminary analysis have been done. The SWAT model has also been set-up for the basin and further fine tuning is in progress. Dr. Nema also asked for an extension of one more year in order to complete all-study objectives, which has been approved by the WG.
7.	Investigating gap areas, current trends and future directions of research in Climate Change Impact on Hydrology and water Resources in India through Scientometrics **Team:** Archana Sarkar; Jyoti Patil; Charu Pandey **Duration:** 2 years (05/22-04/24) **Funding:** NIH	Dr. Archana Sarkar presented the background, objectives, methodology, details of analysis & results of the study. She emphasized that scientometric analysis are very important for finding out the research growth in any particular domain and such analysis should be carried out before taking up any study. Dr. Sudhindra Sharma and Dr. Praveen Thakur, members of working group appreciated the work.
8.	Monitoring and Assessment of Mountain Ecosystem and Services in North-West Himalaya (Phase-II): Monitoring and Modeling of Hydrological Processes in Glaciated and Non-Glaciated Watersheds of North-West Himalaya **Team:** M K Nema; P. K. Mishra; Praveen Thakur (IIRS) **Duration:** 3 years (04/22-03/25) **Funding:** IIRS (30.91)	Not presented due to time constraints as they are the sponsored research projects
New Internal/ Sponsored Studies		
1.	Simulation of operation of multiple reservoirs in Wainganga Basin for conservation and flood control under changing climate scenario **Team:** A R Senthil Kumar; T Thomas; M K Nema; Harsh Upadhyay; Sunil Gurrapu **Duration:** 3 years (04/24-03/27) **Funding:** NIH (21.02)	Dr. A R Senthil Kumar presented the proposed new study. The WG member, Dr. Bhishm Kumar inquired about the requirement of the study from the project authority and suggested to include the relevant personnel from WRD, Maharashtra/ Madhya Pradesh. Dr. Nema informed the requirement of the study as per the earlier discussion with the project authority. The Chairman

		suggested to replicate this type of study in Yamuna Basin at a later stage.
2.	ResSed – Tool development for prediction of elevation-area-capacity curves of the reservoirs **Team:** A R Senthil Kumar; U K Singh; P K Singh; Harsh Upadhyay; Nitesh Patidar **Duration:** 2 years (04/24-03/26) **Funding:** NIH (11.18)	Dr. A R Senthil Kumar presented the proposed new study. No specific comments/suggestions were received.
3.	Integrated operation of Bisalpur and Isarda reservoirs in Banas river basin, Rajasthan **Team:** Archana Sarkar; A R Senthil Kumar; P K Mishra; Harsh Upadhyay; Mr. Sanjay Agarwal **Duration:** 3 years (04/24-03/27) **Funding:** NIH (19.30)	Dr. Archana Sarkar presented the new study. She informed that the development of rule curve based integrated operational framework for existing Bisalpur dam and under construction Isarda dam is important to ensure reliable releases from the reservoirs for conservation purposes considering forecasted inflow and sediment yield.
4.	Water and Land Productivity Accounts for the major river basins of India using water accounting plus for sustaining water and food security: WAPRO-India **Team:** P K Singh; P K Mishra; Vishal Singh; Harsh Upadhyay; P R Patil; A. R. Senthil Kumar **Duration:** 2 years (04/24-03/26) **Funding:** NIH (43.48)	Dr. P K Singh presented the proposed new study. The WG suggested to remove objective number 04 and also advised to drop "…for sustaining water and food security" from the title of the project.
5.	Development of rule-based integrated operation framework for the Mahanadi basin. **Team:** P K Mishra; M K Goel; P K Singh; A R Senthil Kumar **Duration:** 1.5 years (04/24-09/25) **Funding:** NIH (5.0)	Dr. P K Singh presented the proposed new study and no specific comments/suggestions were received.
6.	Assessment of Precipitation Gradients and Temperature Lapse Rates for Hydrological Modelling in a Himalayan Catchment **Team:** P R Patil; M K Nema; P K Mishra; A R Senthil Kumar; Asif **Duration:** 3 years (04/24-03/27) **Funding:** NIH (20.0)	Dr. P R Patil presented the proposed study. Chairman suggested to remove the first objective of study. Dr. Nema informed that flow data will be recorded by installing a flow measuring device at outlet of Henval River under ongoing IIRS-DoS sponsored project Mr. Asif, RA, WRSD will also assist in this study.
7.	Evaluation of Area-Design Curve to estimate sediment distribution in Indian reservoirs **Team:** U K Singh; A R Senthil Kumar; M K Goel; P R Patil **Duration:** 2 years (04/24-03/26)	Dr. U K Singh presented the proposed new study and no specific comments/ suggestions were received.

	Funding: NIH (1.0)	
8.	Water yield potential and flash flood risk assessment under changing climate and land use and strengthening of existing instrumentation in the Teesta River basin up to Domohani. **Team:** Harsh Upadhyay; P K Singh; A R Senthil Kumar; P R Patil **Duration:** 3 years (04/24-03/27) **Funding:** NIH (44.52)	Er. Harsh Upadhyay presented the proposed new study. The Chairman suggested to remove the first two objectives of the study. Further, the WG member Dr. Praveen Thakur (IIRS) suggested to add GLOF component in the study.

Recommended Work Programme for the Year 2024-25

S. No.	Title	Study Team	Duration	Funding
Ongoing Sponsored/ Internal Studies				
1.	Snow and glacier contribution and impact of climate change in Teesta River basin in Eastern Himalaya	P K Singh; Vishal Singh; A K Lohani	3 years (11/19-11/22) Ext. up to 03/24	NMHS-MoEF
2.	Development of Water Accounts for the different sub-basins of Brahmaputra and Barak River Basins in the state of Meghalaya Using Water Accounting Plus (WA+) Framework.	P K Singh; P K Mishra	2 years (08/20-07/22) Extended up to 03/24	NHP
3.	Monitoring and hydrological modeling of Henval watershed in Lesser Himalaya	M K Nema; P K Mishra	3.5 years (08/20-03/24)	NIH
4.	Development of Water Accounts for the selected sub-basins of Brahmaputra, Barak and Irrawady-Chindwin basins in Nagaland using Water Accounting Plus (WA+) Framework.	P K Mishra; P K Singh	2 years (04/21-06/23) Extended up to 03/24	NHP
5.	Hydrological Assessment of Ungauged Basins (Aghanashini, Dasanakatte, Sita Nadi, Madisala Hole, Swarna Nadi and Gurupur River Basins) of the West Flowing Rivers in the Western Ghat Region of Karnataka	Vishal Singh, P K Singh, Harsh Upadhyay; Abhilash R.	3 years (04/22-03/25)	NHP
6.	Spatio-temporal Water Availability under Changing Climate and Land-use Scenarios in Wainganga River Basin	M K Nema; P K Mishra	3 years (04/22-03/25)	NIH
7.	Investigating gap areas, current trends and future directions of research in Climate Change Impact on Hydrology and water Resources in India through Scientometrics	Archana Sarkar; Jyoti Patil; Charu Pandey	2 years (05/22-04/24)	NIH
8.	Monitoring and Assessment of Mountain Ecosystem and Services in North-West Himalaya (Phase-II): Monitoring and Modeling of Hydrological Processes in Glaciated and Non-Glaciated Watersheds of North-West Himalaya	M K Nema; P. K. Mishra; P. R. Patil; Praveen Thakur (IIRS)	3 years (04/22-03/25)	IIRS

New Internal/ Sponsored Studies				
1.	Simulation of operation of multiple reservoirs in Wainganga Basin for conservation and flood control under changing climate scenario	A R Senthil Kumar; T Thomas; M K Nema; Harsh Upadhyay; Sunil Gurrapu	3 years (04/24-03/27)	NIH
2.	ResSed – Tool development for prediction of elevation-area-capacity curves of the reservoirs	A R Senthil Kumar; U K Singh; P. R. Patil; Harsh Upadhyay; Nitesh Patidar	2 years (04/24-03/26)	NIH
3.	Integrated operation of Bisalpur and Isarda reservoirs in Banas river basin, Rajasthan	Archana Sarkar; A R Senthil Kumar; P K Mishra; Harsh Upadhyay; Sanjay Agarwal	3 years (04/24-03/27)	NIH
4.	Water and Land Productivity Accounts for the major river basins of India using water accounting plus: WAPRO-India	P K Mishra; P K Singh; Vishal Singh; Harsh Upadhyay; P R Patil; A. R. Senthil kumar	2 years (04/24-03/26)	NIH
5.	Development of rule-based integrated operation framework for the Mahanadi basin	P K Mishra; M K Goel; A R Senthil Kumar, Harsh Upadhyay	1.5 years (04/24-09/25)	NIH
6.	Assessment of Precipitation Gradients and Temperature Lapse Rates for Hydrological Modelling in a Himalayan Catchment	P R Patil; M K Nema; P K Mishra; A R Senthil Kumar; Asif	3 years (04/24-03/27)	NIH
7.	Evaluation of Area-Design Curve to estimate sediment distribution in Indian reservoirs	U K Singh; A R Senthil Kumar; M K Goel; P R Patil	2 years (04/24-03/26)	NIH
8.	Water yield potential and flash flood risk assessment under changing climate and land use and strengthening of existing instrumentation in the Teesta River basin up to Domohani	Harsh Upadhyay; Vishal Singh; P K Singh; A R Senthil Kumar; P R Patil	3 years (04/24-03/27)	NIH

Er. Omkar Singh thanked the members for their valuable contributions during deliberations in the Working Group meeting. The meeting ended with vote of thanks to the Chair.

ANNEXURE-I

List of Working Group Members who attended the 54th WG meeting

1.	Dr. M. K. Goel, Director, NIH	Chairman
2.	Dr. Bhishm Kumar, IAEA Consultant, Roorkee	Member
3.	Sh. Sudhindra Mohan Sharma, Ex-Nodal Officer, MoDWS, Indore	Member
4.	Dr. Praveen Thakur, IIRS, Dehradun	Member
5.	Dr. Manoj P. Samuel, CWRDM, Kozhikode	Member
6.	Dr. (Mrs.) Sadhana Malhotra, Mindspace, Dehradun	Member
7.	Dr. M. L. Kansal, WRDM, IIT, Roorkee	Member
8.	Dr. S.S. Grewal, (Retd.), Chandigarh	Member
9.	Er. Sudhir Kumar, CE (Design)/Director, IRI, Roorkee	Member
10.	Dr. Ramakar Jha, Professor, NIT Patna (Online)	Member
11.	Er. Vijay Singh, Dy. Director (Hydrology), CWC	Repr. Member
12.	Er. Pankaj Kumar Sharma, CWC, New Delhi (online)	Repr. Member
13.	Dr. A.K. Lohani, Sc. G & Head, SWH Division, NIH	Member
14.	Dr. R.P. Pandey, Sc. G & Head, EH Division, NIH	Member
15.	Dr. Suhas Khobragade, Sc. G & Head, HI Division, NIH	Member
16.	Dr. A R Senthil Kumar, Sc. G & Head, WRS Div., NIH	Member
17.	Dr. Anupma Sharma, Sc. G & Head, GWH Division, NIH	Member
18	Dr. Surjeet Singh, Sc. G & Head, C4S Division, NIH	Member
19	Er. Omkar Singh, Sc. G & Head, Technical Cell, NIH	Member-Secretary

Scientists of NIH:

	C4S Division		**HI Division**
1.	Dr. Surjeet Singh, Sc.G	24.	Dr. M S Rao, Sc.G
2.	Dr. Soban Singh Rawat, Sc.F	25.	Dr. Gopal Krishan, Sc.E
3.	Dr.(Smt) Ashwini A. Ranade, Sc.D	26.	Dr. Santosh M. Pingale, Sc.D
4.	Dr. Sunil Gurrapu, Sc.D	27.	Dr. Tripti Muguli, Sc.D
5.	Dr. Vishal Singh, Sc.D	28.	Sri. Rajeev Gupta, Sc.B
6.	Dr. Lavkush Kumar Patel, Sc.D	29.	Sri. Ruchir Patidar, Sc.B
7.	Dr. Deepak Singh Bisht, Sc.C	30.	Sri V K Agarwal, Sc.B
8.	Dr. Akshaya Verma, Sc.C	31.	Dr. Amit Pandey, Sc.B
9.	Dr. Kuldeep Sharma, Sc.C		**SWH Division**
10.	Sri. Rajat Kumar, Sc.B	32.	Dr. S K Singh, Sc.F
	EH Division	33.	Dr. P C Nayak, Sc.F
11.	Dr. M K Sharma, Sc.F	34.	Dr. Sanjay Kumar, Sc.F
12.	Dr. Rajesh Singh, Sc.E	35.	Dr. Ravindra Vitthal Kale, Sc.E
13.	Dr. Pradeep Kumar, Sc.E	36.	Dr. L N Thakural, Sc.E
14.	Dr. Vinay Kumar Tyagi, Sc.D	37.	Er. J P Patra, Sc.E
15.	Dr. Prasanta Kumar Sahoo, Sc.D	38.	Sri. Om Prakash, Sc.B
16.	Dr. Shakti Suryavanshi, Sc.C	39.	Dr. Soumyaranjan Sahoo, Sc.B
17.	Dr. Shailendra Kumar Kumre, Sc.B	40.	Dr. Richa Pandey, Sc.B
	GWH Division	41.	Sri. Chandra Prakash, Sc.B

18.	Dr. Sumant Kumar, Sc.E		**WRS Division**
19.	Dr. Lagudu Surinaidu, Sc.D	42.	Dr. Archana Sarkar, Sc.,F
20.	Dr. Nitesh Patidar, Sc.C	43.	Dr. P K Singh, Sc.E
21.	Dr. Ajit Kumar Behera, Sc.C	44.	Dr. Manish K. Nema, Sc.E
22.	Dr. Satendra Kumar, Sc.B	45.	Dr. P K Mishra, Sc.D
23.	Sri. Pintu Kumar Gupta, Sc.B	46.	Dr. Pravin Rangrao Patil, Sc.C
		47.	Dr. Umesh Kumar Singh, Sc.C
		48.	Sri. Harsh Upadhyay, Sc.B

In addition, Technical Staff have also participated during presentations of their respective Divisions.

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APPENDIX No. A78.3

REGIONAL CO-ORDINATION COMMITTEE MINUTES

HARD ROCK REGIONAL CENTRE BELAGAVI

Progress of the Work Program for the year 2023-24

S. No.	Project	Study Team	Duration	Status & Comments/ suggestions
INTERNAL STUDIES				
1.	Monitoring and Evaluation of Ground Water Quality of Belagavi City, Karnataka, India	Varadarajan N. (PI) Chandra Kumar S. Abhilash R.	2 years (6/22 - 5/24)	The PI of the study presented the results of the study and denoted the possible potential area of expected pollution due to intensified urbanization. However, Dr. K.V. Jayakumar and Dr. Sen Gupta expressed that the results should be presented in pictorial form for better representation and visibility and proper interpretation. The Chairman expressed that the results may be presented to the corporation officer and local administration for proper utilization and to develop remedial measures.
2	Comprehensive Assessment of Hydrology of Large Rivers basins of Western Ghats of Karnataka	Venkatesh B. (PI) Abhilash R. N. Varadarajan	3 years (4/23 - 4/26)	The PI presented the progress achieved in the study. Dr. K. V. Jayakumar expressed that title should be more expressive and should carry the meaning of the work being carried out. Expressing the similar view, Prof. Lakshman Nandagiri refined the title of study as "**Comprehensive Assessment of Basin Hydrology of Rivers Originating from Western Ghats of Karnataka**". Also, members expressed that, the study should consider the effect of decadal changes in land-use and its impact on the flows in the river.
3	Studies on Occurrence, Distribution of Springs in parts of Western Ghats, India	Abhilash R. (PI) Venkatesh B.	1 year (4/23-3/24)	The Chairman expressed that the study be extended to both, Karnataka and Goa. Dr. Das informed that the NRSC is also carrying out studies on springs in Karnataka and potentially located a spring in Kodagu district of Karnataka. The Chairman expressed that HRRC

S. No.	Project	Study Team	Duration	Status & Comments/ suggestions
				should collaborate with Dr. Das as the Centre is working in Kaveri basin of Karnataka. Dr. Abhilash informed that, he will consult Dr. Das and will have a joint field visit.
4	Water Productivity assessment in Irrigation Projects by Geo-Spatial Optimization Techniques	Abhilash R. (PI) Venkatesh B.	3 years (4/23-4/26)	PI presented the progress achieved till date. He presented the working pattern and water release schedule under the SCADA system installed at Narayanapura Left Bank Command. Members expressed that the study should be carried out such that the local conditions are included in consultation with the NLBC and the farmers of the command for its actual implementation.
SPONSORED PROJECTS				
1.	Groundwater Model Development in Micro Basin of Hard Rock in Krishna and Godavari River Basins of Telangana	B. Venkatesh (PI) M. K. Jose Sudhir Kumar Abhilash R. & Officials from TSGWD	*3 years* (Sep 2019 – Aug 2022) Extended up to August 2023	Dr. Abhilash presented the results of the work in the project. After the presentation, the Chairman suggested to complete the study as early as possible. However, the Telangana Ground Water officials expressed that a field visit to the Chepur area is essential so as to incorporate some of the field features and also to have in-detail discussion with field officials. To this, Chairman expressed that, a field visit may be planned for finalizing the report.
2.	Impact of Sand Mining on Groundwater Regime in Parts of Manjira River Basin, Telangana State	M. K. Jose (PI) B. Venkatesh Chandramohan T. Abhilash R. and officials from TSGWD	*2 years* Sept. 2021 – Aug. 2023	This study was initiated as in-house study by TSGWD. The progress of the study was presented by Telangana State Ground Water official along with Dr. Das. The field data have been obtained for final modeling work. But officials expressed that there is a need to make a field visit and requires a detailed discussion to decide as to how to go about the modelling work and

S. No.	Project	Study Team	Duration	Status & Comments/ suggestions
				to include some of the crucial information to be incorporated in the model.
3	Comprehensive Assessment of Water Availability, Use and Issues for Goa State	B. Venkatesh (PI) Chandramohan T. Abhilash R. and officials of WRD Goa	2 years (1/22 -12/23)	The PI explained the work completed so far. Also, he stressed on the topics such as; calibrating and validating the SWAT model for 3 land use scenarios, i.e., land use scenario of 2005-06, 2011-12 and 2015-16. The basin has been divided into number of smaller watersheds as per the Watershed Atlas of India and water availability is worked at that scale. The future water availability is worked using SSP data for 4.5, 7.0 and 8.5 forcing. The Chairman desired that this study should be completed as early as possible so as to publish this study as reference study and may be presented to state of Goa for it implementation.

Recommended work program for the year 2024-25

S. No.	Project Title	Study Team	Duration	Status
INTERNAL STUDIES				
1.	Comprehensive Assessment of Basin Hydrology of Rivers Originating from Western Ghats of Karnataka	Venkatesh B. (PI) Abhilash R. N. Varadarajan	3 years (4/23-4/26)	On-going
2.	Studies on Occurrence, Distribution of Springs in parts of Western Ghats, India	Abhilash R. (PI) Venkatesh B.	1 year (4/23-3/24)	On-going
3.	Water Productivity assessment in Irrigation Projects by Geo-Spatial Optimization Techniques	Abhilash R. (PI) Venkatesh B.	3 years (4/23-4/26)	On-going

S. No.	Project Title	Study Team	Duration	Status
4.	Groundwater Model Development in Micro Basin of Hard Rock in Krishna and Godavari River Basins of Telangana	B. Venkatesh (PI) Abhilash R. & officials from TSGWD	*3 years* (Sept 2019 – Aug 2022) extended up to March, 2025	On-going
5.	Impact of Sand Mining on Groundwater Regime in Parts of Manjira River Basin, Telangana State	Abhilash R. (PI) B. Venkatesh and officials from TSGWD	*2 years* (Sept 2021 – Aug 2023) extended up to March, 2025	On-going
6.	Comprehensive Assessment of Water Availability, Use and Issues for Goa State	B. Venkatesh (PI) Abhilash R. and Officials of WRD Goa	2 years (01/22 to 12/23) extended up to March, 2025	On-going
New Study				
1.	Comprehensive Assessment of groundwater resources in Shallow Coastal Aquifers of Gurupur and Pavanje basins of Dakshin Kannada, Karnataka	Sushmita Wadde Abhilash R. and B. Venkatesh	2 years June, 2024 – May, 2026	PI presented the objectives of the study. The members expressed that, there is need to delineate the area so as to exclude the saline affected portion of the study area.
2.	Coastal Salinity Studies in Bardez and Tiswai Taluk of Goa State	Abhilash R. (PI) Tripti M. (HQ) Venkatesh B. & Sushmita Wadde	1 year June, 2024 – May, 2025	The CGWB official expressed the objectives and purpose of the study. They also expressed their interest to collaborate with NIH for isotope study. In response, the Chairman expressed that the NIH scientist will collaborate and will carry out the necessary experiments and isotope analysis which are required for this study.

WESTERN HIMALAYAN REGIONAL CENTRE JAMMU

Progress of Work Program for the year 2023-24

S. No.	Title of Project/Study	Recommendations/ Suggestions
Internal Studies (Ongoing)		
1.	Estimation of changes in snow cover and climate-cryosphere interaction in Upper Chenab River Basin	• Er. Ravi Ranjan enquired regarding the source of discharge data of Chenab, PI replied that this was shared by Flood Control Division, Akhnoor. • Dr. H. S. Negi enquired whether any bias correction/validation has been carried out to the ERA5 data. Dr. Deepak Singh Bisht replied that due to the lack of long-term observational data, bias correction could not be carried out. However, since the relative changes are not significantly affected by these biases, the inferences made hold good. • Dr. P. K. Garg suggested exploring higher resolution data sets, other than MODIS, for more detailed snow cover assessments to which PGJ replied that the limited time and computational resources constrained the team to restrict to MODIS for snow cover assessment. • The Chairman queried whether DEM differencing method attempted can be validated with field data available with the PI. PGJ replied in the affirmative. • Dr. Dericks Praise Shukla suggested performing the topographic correction, preferably using SRTM DEM to minimise error. Dr. H. S. Negi suggested to remove slope, aspect and penetration effects on DEM differencing and apprised the techniques used in Chhota Shigri Glacier as well as ground data (like snow density) to fine-tune the mass balance estimation using DEM differencing, to which the PI concurred. • The PI requested for an extension of the project up to June 2024. The request was accepted by the members.
2.	Early signatures of 21st Century on snow cover dynamics in Zanskar River Basin, Ladakh	No specific comments.
3.	Investigation of hydrodynamic approach of flood inundation mapping and assessment of changes in river planforms using a cloud-based GEE platform in data-scarce Western Himalayan basin	Transferred to C4S, NIH-HQ and not presented.

S. No.	Title of Project/Study	Recommendations/ Suggestions
4.	Mass balance of Phuche and Khardung glaciers, Ladakh Range with implications for downstream water availability under changing climate.	PI requested for extension of the project up to December 2024. The requested was accepted by the members.
5.	Comparative analysis of fine-scale satellite & reanalysis precipitation products in Upper Ganga Basin using multi-criterion decision-making	Transferred to C4S, NIH-HQ and not presented.
Internal Studies (New)		
6.	Understanding hydro-cryospheric processes in response to climate change and atmospheric pollutants: A case study of Jhelum basin, Kashmir Himalaya, India	• The Chairman appreciated the research proposal but, considering the heavy instrumentation required for detailed investigation in the study, suggested for submitting the proposal to external funding agencies, like DST. He further suggested initiating the work as an internal study from available resources. PI assured that the study will be initiated as an internal study and the proposal would be submitted to other funding agencies when a call for research proposal is announced. • The Chairman questioned as to how the SPHY model would analyse the impact of atmospheric pollutants on glacier melting. PI clarified that the possibility of incorporating atmospheric pollutants into the SPHY model will be evaluated in consultation with the Co-PIs. • Dr. S. K. Sandal proposed forming a team with different agencies, making it a multi-institutional project wherein, the NIH-WHRC, Jammu can take the lead. PI informed that the proposal will also be submitted as a multi-institutional project, involving interested institutions for collaboration. • The Chairman and the members approved the proposal.
7.	Basin-scale inventorying of rock glaciers for permafrost distribution probability mapping, hydrological storage estimation and hazard vulnerability assessment using Earth Observation and Field data	• The Chairman directed to remove “using Earth Observation and Field data” from the title. • Dr. P. K. Garg opined that the proposal is overambitious, as it encompasses all major river basins of the western Himalaya. He suggested focusing on a single basin with 2-3 key objectives with a focus on storage and risk assessment using existing data for inventorying. PI responded that this study is a preliminary assessment of rock glaciers (RG) for hydrological storage estimation as well as hazard and risk analysis, based predominantly on the satellite data sources and assured existing data will be used for inventorying.

S. No.	Title of Project/Study	Recommendations/ Suggestions
		• Dr. S. K. Sandal acknowledged the importance of the proposal and enquired whether drones can be used to map RGs. PI informed that drones can be used in the field for validation as per availability. • Dr. Dericks P. Shukla, while acknowledging the importance of the study, recommended using the International Permafrost Association (IPA) guidelines for characterizing RGs. He highlighted the need for collaboration with other agencies working in the region. PI assured that the IPA guidelines will be followed and the possibility of collaboration with other agencies will also be evaluated. • The Co-chairman recommended starting the work in a single catchment of the region in the first phase, with the possibility of extending the work to other catchments in future. PI informed that the study will focus on a single river basin in line with the committee's recommendations. • The Chairman and members approved the proposal.
8.	Site Suitability Mapping for Rainwater Harvesting and Spring Rejuvenation in the Tawi Basin	• Dr. S. K. Sandal suggested that watershed approach is the best approach in these kinds of studies and delineation of watershed is the most important step in identifying suitable locations for RWH to which PI concurred. • The Co-chairman suggested to differentiate the methodology, one for GW recharge and one for surface water conservation and advised to consult CGWB in that regard. PI noted the suggestion. • Sh. M. L. Angurala informed that geology of Tawi basin is not favourable for GW recharge, hence the focus should be on RWH for surface water conservation. PI agreed with suggestion and informed that he will utilize the geological information from CGWB and GSI and will focus on surface water conservation and spring rejuvenation. • Dr. Dericks P. Shukla advised to see the scale of the study as geology will not change in smaller watersheds and therefore, Multi Criteria Decision Making (MCDM) rating will not change. He also suggested exploring Machine Learning (ML) approaches. PI welcomed the suggestion and assured that he will explore the usage of ML approaches for MCDM analysis. • The Chairman advised to consult Dr. S. S. Rawat (SSR) for suggestions regarding identifying vulnerable springs in the Tawi region, which can be rejuvenated. PI assured that once the preliminary study is complete, he will collaborate with SSR for spring rejuvenation work. • Since NIH will not construct any RWH, the Chairman advised the PI to showcase the findings of this study to the State Departments so that they can take up the construction work.

S. No.	Title of Project/Study	Recommendations/ Suggestions
		• The Chairman and members approved the proposal.
9.	Development of a User-Friendly Web-Portal for Integrated Snow Cover and Meteorological Analysis with Land Use Change Detection Using Google Earth Engine	• The Chairman enquired about the title justification for which PI replied that the web-portal will contain all the three web-apps mentioned in the proposed title. • Dr. Dericks P. Shukla then enquired about the result output format of this web portal. The PI replied that the web-app would display the snow cover area and land use land cover area information along with the meteorological layer visualization of the selected region and selected date. • The Chairman suggested referring to the algorithm developed for the cloud cover masking in the NMSHE project of NIH. PI agreed to refer to the code for further improvements. • The Chairman and members approved the proposal.
Sponsored/Collaborative Projects (Ongoing)		
10.	Permafrost mapping and characterization of Western Himalayan Region	Not presented as the progress of this study is monitored under NMHS by the funding agency.

Recommended Work Program for the Year 2024-25

S. No.	Title of Study	Team	Duration	Remarks
Internal Studies				
1.	Estimation of changes in snow cover and climate-cryosphere interaction in Upper Chenab River Basin	P. G. Jose (PI) D. S. Bisht	Aug. 2020 – June 2024	Ongoing
2.	Mass balance of Phuche and Khardung glaciers, Ladakh Range with implications for downstream water availability under changing climate.	P. G. Jose (PI) R. A. Mir D. S. Bisht I. Sharma S. Singh G. Singh	July 2021 - Dec. 2024	Ongoing
3.	Understanding hydro-cryospheric processes in response to climate change and atmospheric pollutants: A case study of Jhelum basin, Kashmir Himalaya, India	R. A. Mir (PI) P. G. Jose V. K. Singh I. Sharma S. Singh	May 2024 – Apr. 2027	New Study
4.	Basin-scale inventorying of rock glaciers for permafrost distribution probability mapping, hydrological storage estimation and hazard vulnerability assessment	R. A. Mir (PI) P. G. Jose S. Singh I. Sharma, D. S. Bisht	May 2024 – Apr. 2027	New Study
5.	Site Suitability Mapping for Rainwater Harvesting and Spring Rejuvenation in the Tawi Basin	I. Sharma (PI) S. Singh R. A. Mir	May 2024 – Apr. 2026	New Study
6.	Development of a User-Friendly Web-Portal for Integrated Snow Cover and Meteorological Analysis with Land Use Change Detection Using Google Earth Engine	S. Singh (PI) I. Sharma R. A. Mir	May 2024 – Apr. 2026	New Study
Sponsored/Collaborative Projects (Ongoing)				
1.	Permafrost mapping and characterization of Western Himalayan Region	P. G. Jose (PI) A. P. Dimri (JNU) G. Jeelani (KU) V. Agnihotri (GBPNIHESD)	Aug 2019 – Mar 2024	Ongoing. Funded under NMHS.

CENTRAL INDIA HYDROLOGY REGIONAL CENTRE BHOPAL

Approved Work Programme for the year 2023-24

SN	Title of the Study	Study Team	Duration
R & D Studies (On-going)			
1.	Re-assessment of evapotranspiration (*ETo*) estimation for irrigation planning in Madhya Pradesh	**NIH** R.V. Galkate, R.K. Jaiswal A.K. Lohani Shashi Induwar **MP-WRD, Bhopal** Deepak Satpute Sayyam Jhanjari Sameer Soni	3 years (Nov 2021 – Oct 2024)
2.	Water Availability Assessment for Project Formulation in Sub Basins of Ganga River in Madhya Pradesh	**NIH** R K Jaiswal, Ravi Galkate, A K Lohani. **MP-WRD, Bhopal** B Baghel	3 years (Nov 2021 – Oct 2024)
3.	Development of Reservoir Operation Plan under Climate Change scenarios for Kolar reservoir	**NIH** Shashi Induwar, T. Thomas, R. K. Jaiswal, R.V. Galkate, **MP-WRD, Bhopal** C.E, Hoshangabad, S.E Kolar, E.E Kolar.	3 years (Oct 2021 – Sept 2024)
Sponsored Studies (On-going)			
4.	Integrated Assessment of the Impacts of Climate Change and Land-use Change on the Hydrology of the Narmada basin through Hydrological Modelling Approaches	**NIH** T. Thomas, B. Venkatesh, P. C. Nayak, Surjeet Singh, Shashi Induwar **MP-WRD, Bhopal** Director Hydromet Mahesh Paliwal, B. Baghel.	5 years (Feb 2018 – Sep 2023) Special PDS under NHP
5.	Hydrological Modeling for Evaluation of Return Flow and Irrigation Planning for Optimal Utilization of Water Resource in the Command of Sanjay Sagar Project in Madhya Pradesh	**NIH** R K Jaiswal, Ravi Galkate, T Thomas Shashi Induwar, A K Lohani, Sudheer Kumar, Surjeet Singh **MP-WRD, Bhopal** Director, Hydromet, SE, GW circle, Database Admin, SE, EE, and AEs of Bah Project	4 years (Apr 2019 – Sept 2023) PDS under NHP

6.	Integrated reservoir operation studies for Mahanadi reservoir project complex in Chhattisgarh: SP-56/2021-22/NIH (CIHRC)	**NIH** R K Jaiswal, Ravi Galkate, Shashi Induwar, A. K. Lohani, M. K. Goel, Vishal Singh, Sumit Saini, Dipti Rani **WRD Chhattisgarh** A. Verma, J. K. Das, V. K. Dubey, A. Gupta, P. Awadhiya **IGKV Raipur** S. Chandinah	2 years (Apr 2022-Mar 2024) Special Project under NHP
Sponsored Studies (New)			
7.	Assessment of impact of climate change on water resources in Shipra river basin	**NIH, Bhopal** Ravi Galkate, R. K. Jaiswal, Shashi Induwar, **RNTU, Bhopal** Shalini Yadav, S. K. Sharma	3 years from the date of award (INCCC, M/o Jal Shakti)
8.	Water Resource Management for Tawa Reservoir Project under Climate Change	**NIH, Bhopal** R. K. Jaiswal, Ravi Galkate, Shashi Indwar, **MPU Bhopal** R N Yadav, M P Verma	3 years from the date of award (INCCC, M/o Jal Shakti)

Recommended Work Program for the Year 2024-25

S. No.	Title of Project/Study	Study Team	Duration	Status / Comments	Funding
Internal Studies					
1.	Re-assessment of evapotranspiration (*ETo*) estimation for irrigation planning in Madhya Pradesh	**NIH** Dr. R.V. Galkate Dr. R. K. Jaiswal Dr. A. K. Lohani Ms. Shashi Indwar **MP-WRD, Bhopal** Sh.Sayyam Jhanjari Sh. Sameer Soni	3 years (Nov 2021 – Oct 2024)	Ongoing	Internal
2.	Water Availability Assessment for Project Formulation in Sub Basins of Ganga River in Madhya Pradesh	**NIH** Dr. R. K. Jaiswal Dr. Ravi Galkate Dr. A. K. Lohani **MP-WRD, Bhopal** Dr. B. Baghel	3 years (Nov 2021 – Oct 2024)	On-going	Internal
3.	Development of Reservoir Operation Plan under Climate Change scenarios for Kolar reservoir	**NIH** Ms. Shashi Indwar Dr. T. Thomas Dr. R. K. Jaiswal	3 years (Oct 2021 – Sept 2024)	On-going	Internal

S. No.	Title of Project/Study	Study Team	Duration	Status / Comments	Funding
		Dr. R. V. Galkate **MP-WRD, Bhopal** C.E., Hoshangabad S.E., Kolar E.E., Kolar			
Sponsored Projects					
4.	Integrated reservoir operation studies for Mahanadi reservoir project complex in Chhattisgarh: SP-56/2021-22/NIH (CIHRC)	**NIH** Dr. R. K. Jaiswal Dr. Ravi Galkate Mrs. Shashi Indwar Dr. A. K. Lohani Dr. M. K. Goel Dr. Vishal Singh Sh. Sumit Saini Dr. Deepti Rani **WRD, CG** Sh. A. Verma Sh. J. K. Das Sh. V. K. Dubey Ms. A. Gupta Sh. P. Awadhiya **IGKV, Raipur** Dr. S. Chandniha	2 years (Apr 2022 - Sept. 2024)	Ongoing	Special Project under NHP
5.	Assessment of impact of climate change on water resources in Shipra river basin	**NIH, Bhopal** Dr. Ravi Galkate Dr. R. K. Jaiswal Er. Shashi Indwar **RNTU, Bhopal** Dr. Shalini Yadav Dr. S. K. Sharma	3 years Approval awaited from INCCC. Study will start as internal study from May, 24.	In principle approved by INCCC and final letter of award is awaited.	NIH/ INCCC, MoJS
6.	Water Resource Management for Tawa Reservoir Project under Climate Change	**NIH, Bhopal** Dr. R. K. Jaiswal Dr. Ravi Galkate Er. Shashi Indwar **MPU Bhopal** Dr. R. N. Yadav Dr. M. P. Verma	3 years As approval is awaited from INCCC, study will start as internal study from May 2024	In principle approved by INCCC and final letter of award is awaited	NIH/ INCCC, MoJS

DELTAIC REGIONAL CENTRE KAKINADA

Progress of the Work Programme for the year 2023-2024

S. No.	Project	Study Team	Status & Comments/Suggestions
Internal Project (completed/ongoing)			
1.	Identification of Recharge and Discharge areas of Palar River basin in Tamil Nadu	V.S.Jeyakanthan (PI) Tripti Muguli Y.R. Satyaji Rao R. Venkata Ramana	1. Dr. Siva Kumar suggested to include groundwater level fluctuations as one of the layer in Index method. 2. Prof. Madhavi Ganesan suggested to include detailed methodology adopted to get the raster maps of various thematic layers, especially the lineament density map, and to get the final raster map of recharge and discharge areas. 3. Dr. S V Vijaya Kumar suggested to use LMWL or local rain for better identification of recharge areas instead of using GMWL **RCC recommended for completion of study with the remark that the above comments are to be incorporated in the final report.**
2.	Impact assessment of backwater through drains, creeks and river mouths on groundwater salinity in the Godavari Delta, Andhra Pradesh	Y. R. Satyaji Rao (PI) Sudhir Kumar V. S. Jeyakanthan R. Venkata Ramana	1. Dr. Siva Kumar suggested to compare the salinity leaching phenomena with the present groundwater table in the Godavari delta. 2. Prof. Madhavi Ganesan suggested to identify the sources of high mercury levels in the drains of Godavari delta. 3. Sh. Y. Srinivas suggested to identify the major anthropogenic activities which cause mercury in the drains of Godavari delta **RCC recommended the continuation of the study for the year 2024 -2025.**
3.	Storm water flood management in the coastal city - A case study	R. Venkata Ramana (PI) Y. R. Satyaji Rao V. S. Jeyakanthan	1. Dr. P. V. Raju suggested to use the high-resolution data for better accuracy to estimate impervious parameters. He also gave consent that NRSC will provide high spatial resolution satellite data free of cost for better LULC representation under Amruth city programs from Bhunidhi platform. **RCC recommended the continuation of the study for the year 2024 -2025.**
4.	Climate Change Impact Assessment under Future Scenarios over the East Coast of India: A focus on the	Sabyasachi Swain (PI) Y. R. Satyaji Rao V. S.Jeyakanthan R. Venkata Ramana	1. Dr. P. V. Raju informed that IMD has carried out trend analysis of historical climate over entire Indian Region using 100 years data. However, the RCC appraised that this study includes new assessment of trends, seasonality/concentration, and extreme characteristics which were not considered in IMD trends in the east coastal

S. No.	Project	Study Team	Status & Comments/Suggestions
	Hydroclimatic Extremes		region and shall be helpful to identify the hotspots of extremes. 2. Chairman emphasized the importance of hydrological modelling to study the implications of climate change on the occurrence and magnitude of floods, and water availability over an east-coastal river basin of India. **RCC recommended the continuation of the study with PI from DRC, Kakinada**
5.	Evaluation and post-processing of multi-model short-to medium-range precipitation forecasts: Towards developing a flood early warning system over Subarnarekha Basin	Sabyasachi Swain (PI) Y. R. Satyaji Rao Biswajeet Pradhan Saswata Nandi	1. Dr. P. V. Raju suggested that IMD also provides QPFs, which they share with CWC and NRSC, and can be used in this study. Further, he suggested that once the hydrological model is calibrated and validated for QPFs, it can also be utilized for assessing climate change impacts on the future hydrology of the basin. 2. The Chairman said that the QPFs from IMD shall be procured by NIH, which can then be used for flow forecasting in this study. This would result in a valuable comparative analysis. **RCC recommended the continuation of the study with PI from DRC, Kakinada.**
Sponsored Projects			
6.	High performance Advanced Septic System for Villages and Roadside Restaurants	Y. R. Satyaji Rao (PI)	1. The Chairman suggested to look into the possibility of replicability and up scaling of the pilot project for the benefit of community-based toilets for safe disposal of sewage water into the environment. 2. Prof. Madavi Ganesan suggested to compute the unit cost of the sewage water treatment and its maintenance cost after the completion of the performance evaluation of the project. **RCC recommended for the continuation of the study.**

Recommended Work Programme for the year 2024 – 2025

S. No.	Project	Study Team	Status & Comments /Suggestions
Internal Projects (New)			
1.	A study on Source sustainability – A case study of JJM in Odisha	S. V. Vijayakumar (PI) V. S. Jeyakanthan Y. Siva Prasad P. C. Nayak	1. Dr. P. V. Raju suggested to focus on the difficulties and challenge in quantifying source sustainability in such schemes and to adopt appropriate methodology.

S. No.	Project	Study Team	Status & Comments /Suggestions
			2. The Chairman advised that after conducting the proposed study on the experiences of JJM in select districts in Odisha, same may be extended to address the issues in Pennar basin as well. **RCC recommended the proposed study.**
2.	Water Accounting of Palar River Basin Using Water Accounting+ (WA+) Frame work	V. S. Jeyakanthan (PI) P. K. Mishra Y. R. Satyaji Rao R.Venkata Ramana	1. The Chairman instructed to take up the study in Pennar basin instead of Palar river basin. 2. Dr. Raju informed to use the Indian satellite data wherever possible instead of foreign satellite data. **RCC recommended the proposed study**
3.	Delineation of fresh groundwater zones and simulation of solute transport modelling for the sustainable use of groundwater in the saline zone of Krishna Godavari Delta, Andhra Pradesh	Y. Siva Prasad (PI) Y. R. Satyaji Rao, V. S. Jeyakanthan R. Venkata Ramana	1. The Chairman instructed to take up a similar study in Pennar delta region instead of the KG Delta. 2. Prof. Madhavi Ganesan suggested to use density dependent SEAWAT model to identify seawater intrusion in the study. 3. Sh. Y. Srinivas suggested to drill few tube well to compare the results of VES surveys. **RCC recommended the proposed study.**

NORTH EASTERN REGIONAL CENTRE, GUWAHATI

Approved Work Programme for the year 2023-24

S. No.	Title	Team	Duration	Type	Remarks
1.	Drought characterization and vulnerability assessment in Assam	W R Singh, S Barman, S Arora, S K Sharma, S V Vijayakumar, A K Lohani	2 years (07/22–06/24)	Internal	Ongoing
2.	Short Term Flood Forecasting Using Bootstrap based Artificial Neural Networks within Beki River Basin	S K Sharma, S Barman, S V Vijaya Kumar, A K Lohani	1 year (07/23–06/24)	Internal	Ongoing
3.	Linear hydrological routing using Satellite precipitation datasets for flood forecasting in parts of Brahmaputra Basin	S Arora, W R Singh, S Barman, S K Sharma, S V Vijaya Kumar	1.5 years (10/23–03/25)	Internal	Ongoing
4.	Rainfall Induced Flood Hazard Risk Vulnerability Assessment in East Jaintia Hills, Meghalaya	S K Sharma, S Arora, A K Lohani	1.5 years (10/23–03/25)	Internal	Ongoing
5.	A Coupled Hydrodynamic and Bank Dynamic Modeling Approach for Forensic Analysis of Bankline Erosion Process Along Majuli Island- the Largest Inhabited River Island in the World	S Barman, R K Bhattarcharjya, M K Dutta, W R Singh	3 years (04/21–03/24)	DST SERB Sponsored	Completed
6.	Hydrodynamic modeling for riverbank protection- A case study	S Barman, W R Singh, S Arora, S K Sharma, S V Vijaya Kumar	1.5 years (10/23–03/25)	Internal	Ongoing

Recommeded Work Programme for the year 2024-25

S. No.	Title	Team	Duration	Type	Remarks
1.	Drought characterization and vulnerability assessment in Assam	W R Singh, S Barman, S Arora, S K Sharma, S V Vijayakumar, A K Lohani	2 years (07/22–06/24)	Internal	Ongoing
2.	Short Term Flood Forecasting Using Bootstrap based Artificial Neural Networks within Beki River Basin	S K Sharma, S Barman, S V Vijaya Kumar, A K Lohani	1 year (07/23–06/24)	Internal	Ongoing
3.	*Linear hydrological routing using Satellite precipitation datasets for flood forecasting in parts of Brahmaputra Basin	S Arora, W R Singh, S Barman	1.5 years (10/23–03/25)	Internal	Ongoing
4.	Rainfall Induced Flood Hazard Risk Vulnerability Assessment in East Jaintia Hills, Meghalaya	S K Sharma, S Arora, A K Lohani	1.5 years (10/23–03/25)	Internal	Ongoing
5.	Hydrodynamic modeling for riverbank protection-A case study	S Barman, W R Singh, S Arora, S K Sharma, S V Vijaya Kumar	1.5 years (10/23–03/25)	Internal	Ongoing
6.	*Potential Recharge Zoning and Projection of Future Water Resources Potential in Singda Dam of Manipur	W R Singh, S Barman, S Arora, M Maza	2 years (04/24–03/26)	Internal	New Study
7.	*Isotope characterization of waters and Hydrograph Separation in Dibang river catchment in Arunachal Pradesh*	S Arora, W R Singh, S Barman, S K Sharma, S S Rawat	3 years (04/24–03/27)	Internal	New Study
8.	*Flood Inundation Modelling of Pagladiya River Basin of Assam	S K Sharma, S Barman, S Arora	1 years (04/24–03/25)	Internal	New Study

* For Item 19.4 to 19.7, the PIs are requested to adhere to the observations of the committee.

CENTRE FOR FLOOD MANAGEMENT STUDIES, PATNA

Approved Work Program for the year 2023-2024

S. No.	Title	Study Team	Duration
Internal Studies			
1	Design flood estimation for small structures in the south Bihar area.	Pankaj Mani (PI), J. P. Patra B. Chakravorty, Pravin R Patil, I C Thakur, Director WALMI	2 years (04/21-03/23) Extended up to September 2023
2	Influence of non-stationarity on flood frequency analysis for South-Bihar region	Pravin R. Patil (PI), Pankaj Mani, Suryansh Mandloi	02 years (05/23-03/25)
3	Evaluation of hydrologic models for Gandak river basin	Suryansh Mandloi (PI), Pankaj Mani, Pravin Rangrao Patil	02 years (05/23-03/25)
Sponsored Study (PDS/NHP)			
1.	Modeling and management of erosion and sedimentation processes in a reach of Gandak river using morphodynamic modeling	Pankaj Mani(PI) J. P. Patra & WRD Bihar	3 years (05/21-04/24)

Gist of Discussions on Study Presentations

S. No.	Title of Study/Study Group/ Start/Completion Dates	Status and Recommendations/ Suggestions
Internal Studies		
1.	Design flood estimation for small structures in the South Bihar area	The progress of the study was presented by Dr. P. Mani. The study is completed and the report has been sent to Dr. Rakesh Kumar (Prof. Sharda University & Ex-Scientist NIH) for review. The Director suggested to finalize the report after incorporating the reviewer's comments.

S. No.	Title of Study/Study Group/ Start/Completion Dates	Status and Recommendations/ Suggestions
2.	Evaluation of hydrologic models for Gandak river basin	The progress of the study was presented by Er. Suryansh Mandloi, Sc. B. The Chairman suggested using IMERG or APHRODITE data for precipitation in the Himalayan region. The representative from IMD informed that rainfall data for the Nepal portion could be obtained from IMD with special permission and also to inquire to FMISC about rainfall data of Nepal. The Director GFCC advised to validate the GRACE equivalent water thickness with data from CGWB. Dr. A. K. Lohani conveyed the availability of fine resolution Cartosat DEM for the Ganga basin at NRSC and asked to explore the use of DEM in study.
Sponsored Study (PDS/NHP)		
3.	Modeling and management of erosion and sedimentation processes in a reach of Gandak river using morphodynamic modelling.	The study's progress was presented by Dr. Pankaj Mani. The flow model calibration and validation including morphodynamic simulation has already been completed however further analysis is delayed following some trouble in MIKE 21C software. After Windows 10 was updated in January 2024, the MIKE 21C stopped working, showing compatibility issues. DHI has advised to upgrade the software. However, temporary license for MIKE 21C software is being attempted while regular upgradation will also be taken up shortly. The Chairman suggested early completion and closure of the PDS study. Once the temporary license is made available, the study would be completed within 3 months period.
Discussion on Proposed Studies for 2024-25		
4.	Morphological study of Kichha river for selection of a new site for Kichha barrage in Udham Singh Nagar, Uttarakhand	The study proposal was presented by Er. Shubham Shaurabh. Further, it is elaborated by Dr. P. Mani about the role of NIH and the objectives of the study.
5.	Urban Flood Modeling and Drainage Design for selected region (Phulwari Sharif) of Patna, Bihar	The study proposal was presented by Er. Shubham Shaurabh. IMD informed that recently ARG has been installed at Manav Bharti School Campus within study area and the data may be used. The coordinator suggested to inquire and get high-resolution DEM developed by SOI. He also agreed to help through NPMU to obtain the DEM. IMD official suggested modifying the study title and remove “Patna city” from the title of the study.

S. No.	Title of Study/Study Group/ Start/Completion Dates	Status and Recommendations/ Suggestions
6.	Application of macroscale hydrologic model to estimate design flood in Gandak River basin	The study proposal was presented by Er. Minotshing Maza. The Chairman instructed to remove the 1st objective of the study proposal (To study the effect of using temperature and precipitation lapse rate on streamflow simulation). He advised to get reference from Dr. A. K. Lohani temperature lapse rate used in Glacier/ GLOF studies at HQ. Dr. Lohani suggested to use IMERG data for precipitation. The Chairman instructed to get the help of Dr. Vishal Singh for obtaining high quality soil data. IMD informed about the availability of temperature data and temperature lapse rate. He advised to send data request for availing the same.
7.	Sediment yield modelling of the Gandak river basin using SWAT	The study proposal was presented by Er. Rajesh Ranjan.

Recommended Work Programme for the year 2024-25

S. No.	Title	Study Team	Duration
Ongoing Internal Study			
1.	Evaluation of hydrologic models for Gandak river basin	Suryansh Mandloi (PI), Pankaj Mani, Shubham Shaurabh, Pravin Rangrao Patil	02 years (05/23-03/25)
Sponsored Study (PDS/NHP)			
1.	Modeling and management of erosion and sedimentation processes in a reach of Gandak river using morphodynamic modeling	Pankaj Mani(PI), J. P. Patra, & WRD Bihar	3 years (05/21-04/24) (requested to extend by 6/24)
New Studies (Proposed)			
1.	Morphological study of Kichha river for selection of new site for Kichha barrage in Udham Singh Nagar, Uttarakhand.	Pankaj Mani (PI), Shubham Shaurabh, Anil Kumar, Atm Prakash	01 years (04/24-03/25)
2.	Urban Flood Modeling and Drainage Design for part of Phulwari Sharif, Patna, Bihar	Shubham Shaurabh, Dr. Pankaj Mani, Suryansh Mandloi, Anil Kumar, Atm Prakash	03 years (04/24-03/27)
3.	Sediment Yield modelling of the Gandak River basin using SWAT Model	Rajesh Ranjan (PI), Dr. Pankaj Mani	3 years (04/24-03/27)

4.	Application of macroscale hydrologic model to estimate design flood in Gandak river basin	Minotshing Maza (PI), Dr. Pankaj Mani, Dr. Waikhom Rahul Singh, Suryansh Mandloi, Dr. Ankur Srivastava, PDF, Univ of Technology, Sydney	3 years (04/24-03/27)

NORTH WESTERN REGIONAL CENTRE, JODHPUR

Approved Work Programme for the year 2023-24

S.No.	Title of the Project	Team	Duration (Start Date – End Date)	Funding
1	Assessment of the Water Level Rise Crisis in Jodhpur, Rajasthan: A Comprehensive Follow-up Study with Challenges and Remedial Approaches	Sourabh Nema (PI) Sudesh Choudhary, Anupma Sharma, Gopal Krishan	1.5 years (Nov. 2023 – Mar. 2025)	Internal funding (NIH)
2	Identification of heterogeneous crop at farm scale using remote sensing data in IGNP canal command area	Sudesh Choudhary,(PI) Sourabh Nema, Anupma Sharma, Nitesh Patidar	1.5 years (Nov. 2023 – Mar. 2025)	Internal funding (NIH)
3	Hydrological Monitoring in Jojari River Basin	Sourabh Nema (PI) Sudesh Choudhary, Anupma Sharma, Shubham Meena	1.5 years (Nov. 2023 – Mar. 2025)	Internal funding (NIH)
4	Preparation of Status Report of the Salinity Ingress in Coastal Area of Saurashtra and Kachchh, Gujarat State	Anupma Sharma, Sourabh Nema, Sudesh Chaudhary, Shubham Meena	1.5 years 024 – June 2025)	GWRDC Gujarat

Recommended Work Programme for the year 2024-2025

S. No.	Project Title	Study Team	Duration	Funding	Status
1.	Assessment of the Groundwater Level Rise Crisis in Jodhpur City, Rajasthan: A Comprehensive Follow-up Study with Challenges and Remedial Approaches	Dr. Sourabh Nema Sh. Sudesh S. Choudhary Dr. Anupma Sharma Dr. Gopal Krishan Sh. Akshay V. Dahiwale	1 year 4 months (Nov. 2023 to Mar. 2025)	Internal	Ongoing
2.	Identification of heterogeneous crops at farm scale using remote sensing data in IGNP canal command area	Sh. Sudesh S. Choudhary Dr. Sourabh Nema Dr. Anupma Sharma Dr. Nitesh Patidar Sh. Dilip Barman	1 year 4 months (Dec. 2023 to Mar. 2025)	Internal	Ongoing
3.	Hydrological Monitoring in Jojari River Basin	Dr. Sourabh Nema Sh. Sudesh S. Choudhary Dr. Anupma Sharma Dr. M. K. Sharma Sh. Akshay V. Dahiwale Sh. Malkhan Singh Jatav	1 year 4 months (Dec. 2023 to Mar. 2025)	Internal	Ongoing

S. No.	Project Title	Study Team	Duration	Funding	Status
	Enhancing the Sustainability of Water Resources Through Integrated Assessment and Management in LUNI River Basin – Rajasthan **(*Major project with sub-projects (4-6) at NWRC & 4 sub-projects at NIH Roorkee*)**	Dr. Anupma Sharma (Project Coordinator) Scientists from GWH Div & NWRC Jodhpur	3 years (04/24 – 03/27)		New
4.	Analyzing the Flash Flood events in the Luni River Basin and Remedial Measures to Store Excess Water.	Sh. Akshay V. Dahiwale Dr. Sourabh Nema Dr. Anupma Sharma Sh. Dilip Barman Sh. Malkhan Singh Jatav	1 year 9 months (April 2024 to Dec.2025)	Internal	New
5.	Assessment of Water Productivity, Land Productivity and Agricultural Drought in Luni River Basin	Sh. Dilip Barman Dr. Sourabh Nema Dr. Prabhash K. Mishra Dr. Anupma Sharma Sh. Malkhan Singh Jatav Sh. Akshay V. Dahiwale	2 years (April 2024 to March 2026)	Internal	New
6.	Assessment of the Diversified Crop Types Using Remote Sensing Data in Luni River Basin	Sh. Malkhan Singh Jatav Sh. Sudesh S. Choudhary Dr. Anupma Sharma Dr. Nitesh Patidar Sh. Dilip Barman	2 years 6 months (April 2024 to Sept 2026)	Internal	New
7.	Preparation of Status Report of the Salinity Ingress in Coastal Area of Saurashtra and Kachchh, Gujarat State	Dr. Anupma Sharma Dr. Sourabh Nema Sh. Sudesh S. Choudhary Dr. Ajit Behera Dr. L. Surinaidu Dr. Nitesh Patidar Sh. Malkhan Singh Jatav	2 years 6 months (April 2024 to Dec 2026)	External	New

APPENDIX No. A78.4

LIST OF PAPERS PUBLISHED/ACCEPTED FOR PUBLICATION DURING APRIL, 2023 – MARCH, 2024

LIST OF PAPERS PUBLISHED DURING 2023-24

S.No.	Item	Published 2023-24
1.	International Journal	98
2.	National Journal	13
3.	International Conference/ Seminar/ Symposium	115
4.	National Conference/ Seminar/ Symposium	81
5.	Books/Chapters	39
	Total	**346**

BOOK	
1.	Bezzeghoud, M., Ergüler, Z.A., Rodrigo-Comino, J., Jat, M.K., Kalatehjari, R., Bisht, D.S., Biswas, A., Chaminé, H.I., Shah, A.A., Radwan, A.E. and Knight, J. (2024). "Recent Research on Geotechnical Engineering, Remote Sensing, Geophysics and Earthquake Seismology." Springer, Cham.
2.	Chenchouni, H., Zhang, Z., Bisht, D.S., Gentilucci, M., Chen, M., Chaminé, H.I., Barbieri, M., Jat, M.K., Rodrigo-Comino, J., Panagoulia, D. and Kallel, A., (2024). "Recent Advancements from Aquifers to Skies in Hydrogeology, Geoecology, and Atmospheric Sciences". Springer, Cham.
3.	Kumar, Manish, Keisuke Kuroda, Santanu Mukherjee, Long D. Ngiehm, Meththika Vithanage, Tyagi, V.K. (2024). Wastewater Surveillance for Covid-19 Management. The Handbook of Environmental Chemistry Series, Springer Cham, pp 374, ISBN: 978-3-031-53905-3.
4.	Patle D, Awasthi MK, Nema S and Nema RK. (2023). Groundwater Potential Zoning of River Basins of Madhya Pradesh Using Geoinformatics. Kavya Publications, Delhi. 1st Edition. Total Page: 274. ISBN: 978-81-19944-51-4
5.	Rawat, S.S., Bisht, D.S., Raina, G. (2023) "Spring Atlas of Ravi River Catchment of Himachal Pradesh". National Institute of Hydrology, Roorkee.
6.	Rawat, S.S., Bisht, D.S., Raina, G. (2023) "Spring Atlas of Tawi River Catchment of Jammu & Kashmir". National Institute of Hydrology, Roorkee.
7.	Rawat, S.S., Bisht, D.S., Kulkarni, H., Kumar, S. (2024) "Springshed Management in the Mountainous Regions of India." DoWR, RD & GR, Ministry of Jal Shakti, Government of India (ISBN: 978-93-340-3741-8)
8.	Tyagi, V.K. and Ojha, C.S.P (2023). Landfill leachate management. International Water Association publishing (IWAP). pp 496. ISBN: 9781789063301

CHAPTERS IN BOOK	
1.	Balasundaram, G., Gahlot, P., Kazmi, A.A., Tyagi, Vinay K. (2023) Overview of Thermal Based Pre-Treatment Methods for Enhancing Methane Production of Sewage Sludge. In: Management of Wastewater and Sludge. 1st Edition, CRC Press (Taylor & Francis), pp. 14, eBook ISBN: 9781003202431.
2.	Bhagwat, A. and Ojha C.S.P (2023). Efficient and economical landfill leachate management with Phytoremediation. Landfill Leachate Management. Chapter-16, Landfill leachate Management. International Water Association (IWA) Publishing, Book No:5567, doi: 10.2166/9781789063318_0361
3.	Chhoden, K., Chhavi K. Manchanda (2023), Ground Water and Pond Water Quality assessment of District Ropar, Punjab, Water Science and Technology, Published by ABS Books; ISBN : 978-93-94424-62-3.
4.	Choudhary, S., Jain, J., Pingale, S.M., Khare, D. (2023). A Comprehensive review on mapping of groundwater potential zones: Past, present and future recommendations. In: Balaji, E., Veeraswamy, G., Mannala, P., Madhav, S. (eds) Emerging Technologies for Water Supply,

	Conservation and Management. Springer Water. Springer, Cham. https://doi.org/10.1007/978-3-031-35279-9_6.
5.	Gahlot, P., Tyagi, V.K. (2023). WBE: An Integral Part of Mass Surveillance of COVID-19?. In: The Handbook of Environmental Chemistry. Springer, Berlin, Heidelberg. https://doi.org/10.1007/698_2023_993
6.	Gahlot, P., Gowtham B., Banafsha Ahmed, Kazmi, A.A., Tyagi, Vinay K. (2023) Microbe-material interactions for direct interspecies electron transfer in anaerobic digestion. In: Material-Microbe Interactions-Environmental Biotechnological Perspective. Academic Press (Elsevier), pp. 47-58. ISBN: 978-0-323-95124-1
7.	Gunjiyal, N., Ojha, C.S.P., Tyagi, Vinay K. (2023) Prevalence of antibiotics and antibiotic resistance genes (ARGs) in landfill leachate. In: Landfill leachate management. International Water Association publishing (IWAP). pp 393-410. ISBN: 9781789063301
8.	Kansal, M.L., Singh, S. (2024). "Landslide Hazard and Risk Management Framework for Alaknanda Basin in the Indian Himalayan Region, In: Landslide: Susceptibility, Risk Assessment and Sustainability Application of Geostatistical and Geospatial Modeling, Springer, Cham, pp. 621-644.
9.	Kaoutar Aboudi, Rajpal, Ankur, Tyagi, V.K., Tawfik, A. (2023). Aerobic treatment of landfill leachate. In: Landfill leachate management. International Water Association publishing (IWAP). pp 15-36. ISBN: 9781789063301
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13.	Malyan, S.K., Kumar, S., Singh, R., Singh, S., Anand, G., Upadhyay, S., Saini, K., Kumar, S.S. (2023). Algal intervention as nature-based solution for treatment of landfill leachate (In. Algae Based Bioelectrochemical Systems for Carbon Sequestration, Carbon Storage, Bioremediation and Bioproduct Generation. Eds. D. M. Mahapatra, S. S. Kumar, L. Singh), Academic Press, Elsevier, London, UK (ISBN: 978-0-323-91023-1), pp.21-32.
14.	Mandloi, S., Jayakumar, K.V. (2023). Designing Stormwater Drainage Network for a Part of Indore City and Development of Flood Control Measures using SWMM. EIACP (PC-RP) Special Issue, 2023 Sustainable Lifestyle approaches towards Environment and Climate Change. (ISSN 0972-4656 MINENVIS Monograph)
15.	Nagashree, G.E., Nema, M.K. (2023). "Comparative Assessment of Different Machine Learning Models to Estimate Daily Soil Moisture." In: Timbadiya, P.V., Patel, P.L., Singh, V.P., Mirajkar, A.B. (eds) Geospatial and Soft Computing Techniques. HYDRO 2021. Lecture Notes in Civil Engineering, Vol-339, Springer, Singapore. https://doi.org/10.1007/978-981-99-1901-7_44
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21.	Radha Pyari, K., Dar, Tanveer A., Chhoden, K. (2024), Spring Water Quality Monitoring and Analysis. Resource book for Springshed management of Mountainous Region of India" Department of Water Resources, River Development and Ganga Rejuvenation, MoJ (GOI).
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26.	Singh, Mandeep, Ali, Muntjeer, Nehaun, Tyagi, Vinay K., Kazmi, A.A., Ojha, C.S.P (2023). Landfill leachate management. In: Landfill leachate management. International Water Association publishing (IWAP). pp 429-462. ISBN: 9781789063301
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30.	Tawfik, Ahmed and Tyagi, V.K. (2023) Aanerobic treatment of landfill leachate. In: Landfill leachate management. International Water Association publishing (IWAP). pp 37-56. ISBN: 9781789063301
31.	Tawfik, Ahmed and Tyagi, V.K. (2023) Treatment of landfill leachate containing emerging micro-pollutants. In: Landfill leachate management. International Water Association publishing (IWAP). pp 195-212. ISBN: 9781789063301

32.	Thapliyal, M., Prabhakar, A.K. (2024). Assessment of Land Use—Land Cover Changes in District Dehradun (1991–2021). In: Developments and Applications of Geomatics. DEVA 2022. Lecture Notes in Civil Engineering, vol 450. Springer, Singapore. (pp 55–68). https://doi.org/10.1007/978-981-99-8568-5_5

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44.	सौरभ नेमा, मनीष कुमार नेमा, एवं मनोज अवस्थी (2023), 'सुदूर संवेदन एवं भौगोलिक सूचना तंत्र तकनीक का उपयोग करके स्थानिक फसल मानचित्रण और सटीकता मूल्यांकन', 7वीं राष्ट्रीय जल संगोष्ठी 17–18 अगस्त 2023: "जलवायु परिवर्तन एवं जल प्रबंधन", राष्ट्रीय जल विज्ञानं संस्थान रूड़की
45.	पी.के. मिश्रा, पी.के. सिंह, पी.के. अग्रवाल, नरेश कुमार (2023), 'नहर कमांड क्षेत्र के लिए भूमि एवं जल उत्पादकता का अनुमान लगाने में उपग्रह आधारित ओपन एक्सेस आंकड़ों की उपयोगिता', 7वीं राष्ट्रीय जल संगोष्ठी 17–18 अगस्त 2023: "जलवायु परिवर्तन एवं जल प्रबंधन", राष्ट्रीय जल विज्ञानं संस्थान रूड़की
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52.	Jeyakanthan, V.S, Venkataramana R. and Satyaji Rao, Y.R. (2023). Application Of Sentinel-1 Data for Reservoir Capacity Estimation. Proceedings of the National Seminar on Hydrology with special reference to Hydrological Solutions for Sustainable Development organized by the Association of Hydrologists of India (AHI) and PSG Institute of Advanced Studies during 1-2 December 2023, at Coimbatore, Tamilnadu.
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56.	Kumar, Satendra, Sharma, A., Jodha, Kanak, Kumar, Pradeep & Panwar, Nav Ratna (2023). Comparison of Drip and Flood Irrigation Scenarios on Productivity and Water use Efficiency of Onion Grown in Arid Climate. In INGWC 2023, at IIT Hyderabad, 5 to 6 Dec., 2023.
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74.	Suryavanshi, S., Raju, Keshni, Kumar, Hareesh and Deepa Elizabeth Johnson (2023) 'Long-Term Assessment of Extreme Temperature Events in Ganga Basin', in National Conference on the Role of Science Engineering and Technology, Swadeshi Sciences movement of India, In TMU, Moradabad 03rd November, 2023.
75.	Swain, S., Satyaji Rao, Y.R., Venkata Ramana, R. and Jeyakanthan, V.S. (2023). A Comprehensive Analysis of Hydro Climatic Variability over Godavari Delta: Trends, Extremes, and Seasonality with Implications for Sustainable Development Goals. Proceedings of the National Seminar on Hydrology with special reference to Hydrological Solutions for Sustainable Development organized by the Association of Hydrologists of India (AHI) and PSG Institute of Advanced Studies during 1-2 December 2023, at Coimbatore, Tamilnadu.
76.	Tomar, A., Rajpal, Ankur, Kazmi, A.A., Goel, A.K., Tyagi, Vinay K. (2023) Advanced anaerobic bio-digester: A DRDO based bio-digester for human fecal treatment. In: Institute Research Day, March 14, 2023 at Indian Institute of Technology Roorkee. (Best Poster Award)
77.	Tomar, A., Rajpal, Ankur, Kazmi, A.A., Goel, A.K., Tyagi, Vinay K. (2023) Sustainable Solution for Sanitation: A DRDO based bio-digester for human fecal treatment. In: Uttarakhand Udyog Mahotsava, March 18-20, 2023. (Best Poster Award)
78.	Utagi, Ujwal, Purandara, B.K., Abhilash R., Malkai, D.S. and Hegde S.R. (2023). Impact of LULC on Sustainability of Springs in Parts of Belagavi District, Karnataka. 38th National Convention of Civil Engineers, Water Management for Sustainability using emerging Technologies"on 8th and 9th Oct.2023 at KLE Centenary Convention centre, JNMC Campus, Belagavi.
79.	Venkata Ramana, R., Satyaji Rao, Y.R., and Jeyakanthan, V.S. (2023). Urban flood simulation using hydrodynamic model-SWMM and HEC RAS. Proceedings of the National Seminar on Hydrology with special reference to Hydrological Solutions for Sustainable Development organized by the Association of Hydrologists of India (AHI) and PSG Institute of Advanced Studies during 1-2 December 2023, at Coimbatore, Tamilnadu.
80.	Venkata Ramana, R., Jeyakanthan, V.S. and Satyaji Rao, Y.R. (2023). Spatial Variations of Land Use Land Cover Changes in Urban Catchment". National Seminar on Hydrology with special reference to Hydrological Solutions for Sustainable Development organized by the Association of Hydrologists of India (AHI) and PSG Institute of Advanced Studies during 1-2 December 2023, at Coimbatore, Tamilnadu.
81.	Venkatesh, B., Abhilash, R., and Ananda Havannavar (2023). Flood Inundation Maps for Krishna River – A Case Study of 2019 flood of Belagavi District. 38th National Convention on Civil Engineering, Water Management for Sustainability using emerging Technologies"on 8th and 9th Oct.2023 at KLE Centenary Convention centre, JNMC Campus, Belagavi.

APPENDIX No. A78.5

LIST OF WORKSHOPS/ TRAINING COURSES/ SYMPOSIA ATTENDED/ORGANISED DURING APRIL, 2023 – MARCH, 2024

LIST OF WORKSHOPS/ TRAINING COURSES/SYMPOSIA

SN	ACTIVITES	PERIOD	VENUE
INTERNATIONAL ACTIVITIES			
1	International Conference on Alternative Fuels, Energy and Environment 2023 (ICAFEE 2023)	October 6-8, 2023	Erciyes University, Kayseri, Turkey
2	An event on "Enabling policymakers in facilitating water security and source sustainability through creation of web GIS enabled inventory of Himalayan Spring in UN COP28	December 9, 2023	Dubai
3	HKH CryoHub workshop organized by ICIMOD through online mode	December 14-15, 2023	ICIMOD Nepal
4	Special Session on "Impact of Climate Change on the Water Resources System of the Indus Basin" during International Conference on "Future of Water Resources" organized by Deptt. of Water Resources Development and Management, IIT Roorkee and NIH Roorkee	January 19, 2024	NIH Roorkee
5	Training workshop on River bank Filtration and constructed wetlands- source sustainability, distribution network and decentralized waste water management"	March 3, 2024	NIH Roorkee
6	Special Session on IAHS HELPING Decade: Science for Solutions during Roorkee Water Conclave (RWC) – 2024	March 3, 2024	IIT Roorkee
7	Third edition of "Roorkee Water Conclave (RWC) – 2024", with the theme of 'Responsible Water Management & Circular Economy	March 4-6, 2024	IIT Roorkee, NIH Roorkee
NATIONAL ACTIVITIES			
SEMINARS/SYMPOSIA/CONFERENCES			
1	EO data analysis for Disaster management	July 12, 2023	ISI, Kolkata
2	Status of Traditional Water Resources (Springs) of Ravi River Catchment	October 20, 2023	Government Degree College, Chamba, Himachal Pradesh
3	National Conference on the Role of Science Engineering and Technology	November 3, 2023	TMU, Moradabad
TRAINING COURSES/WORKSHOPS/BRAINSTORMINGS			
1	Workshop on "Basic Hydrology-Measurement and Use of Hydrological Data"	April 11-13, 2023	Water Resources Department, Panaji, Goa
2	Second Training of Trainers Course on Usage and Applications of DSS(PM)	April 17 - 28, 2023	NIH, Roorkee
3	Training on "Consultation Workshop on Reservoir Bathymetry and Water Accounting in Irrigated Systems using Google Earth Engine (GEE)" jointly organized by NIH Roorkee and World Bank	April 24-May 03, 2023	NIH Roorkee
4	Consultants' workshop under NHP	April 29, 2023	Online
5	Training on "Hydrological Modelling" jointly organized by NERIWALM Tezpur & CFMS Patna	May 05-19, 2023	NERIWALM Tezpur

6	Training on "Use of Geospatial Technologies In Flood Management and Erosion Control" jointly organized by NIH Roorkee and NEHARI, Brahmaputra Board.	May 08-12, 2023	NEHARI, Guwahati
7	Internship training program on "Exposure to Various Research Activities of NIH Roorkee".	May 08-12, 2023	NIH, Roorkee
8	Brainstorming Workshop on "Development of Standard Operating Procedure (SOP) for Springshed Management"	May 15, 2023	NIH, Roorkee
9	Workshop on the State Specific Action Plan (SSAP) for all States/UTs coordinated by NIH under NWM.	May 17, 2023	New Delhi
10	Training course on "Hydrological Modelling using SWAT+".	May 22-27, 2023	NIH, Roorkee
11	Himalayan 1st FRESH WATER Workshop organized by IIT Roorkee and NIH Roorkee	June 6, 2023	IIT Roorkee
12	Training course on 'TUFLOW Hydraulic modelling: Flood Inundation modelling (1D, 2D & 3D) including Coastal and Urban floods, Sediment transport and Water quality'	June 26-28, 2023	NIH Roorkee
13	Orientation program on "Study of Various Possible Scenarios for Understanding the Long-term Effect of en-route Canal Irrigation for Proposed Mahanadi-Godavari Link"	June 30, 2023	NIH, Roorkee
14	Workshop on DSS(PM) Pilot Basin Applications for Maharashtra State WRD Officers	July 18, 2023	Online
15	Training program on "Watershed & Waterbodies Management" jointly organized by NIH, Roorkee and NEHARI, Guwahati.	August 21-25, 2023	NEHARI, Guwahati
16	Orientation program for newly appointed Scientists of NIH Roorkee	August 28-September 01, 2023	NIH, Roorkee
17	SSAP Inception workshop for J&K	September 9, 2023	IIT Jammu Hybrid Mode
18	Training on "Ground-Penetrating Radar (GPR)" through M/s Logis Geotech to the Scientists/Staff of NIH.	September 15, 2023	NIH Roorkee
19	Training on "Evapotranspiration (ET) & Eddy Covariance (EC) measurement instrument" through M/s LI-COR to the Scientists/Staff of NIH.	September 19, 2023	NIH Roorkee
20	Training course on Springshed Management	October 03-07, 2023	NEHARI, Brahmaputra Board, Guwahati
21	Training Course on Hydrological Modelling	October 9-13, 2023	NERIWALM, Assam
22	Training Course on "Application of Space Technology for Flood-relate Disaster Management Support" sponsored by ISRO	October 9-14, 2023	NIH Roorkee
23	Hydrological problem in the costal and deltaic region	October 31, 2023	RC-Kakinada
24	Workshop on 'Natural treatment systems: Understanding technology, economics, and decision criteria' and Project Review Meeting in association with IRMA, Anand	November 03-04, 2023	IRMA, Anand
25	Technical Session on "Latest Trends and Technologies in Geospatial Domain" by M/S Hexagon Geospatial (Intergraph – SG&I) through Online Mode	November 6, 2023	NIH Roorkee

26	Training program on 'Hydro-Meteorological Data Analysis for Climate Change Studies'	November 20-24, 2023	NIH Roorkee
27	Training program on "System modelling for the Proposed Mahanadi-Godavari Link"	December 4-8, 2023	NIH, Roorkee
28	Training program on "Basic Hydrology"	December 4-8, 2023	WRD Meghalaya
29	Hands-On Training of ICP-MS and GC-MS for Scientific Cadre Officials of CWC	December 11-15, 2023	NIH Roorkee
30	Urban Hydrological Studies of Pilot Area using Hydrological Instruments in Greater Hyderabad Municipal Corporation (GHMC) Area	December 14, 2023	I&CAD, Hyderabad
	Brainstorming Session on 'Vision for the NIH: 2023-24 & Beyond' on the 46th Foundation Day of NIH	December 15-16, 2023	NIH, Roorkee
31	National Workshop on "Risk Informed Dam Safety Management" Training Centre, Aam Bagh, Rishikesh, Uttarakhand	December 21-22, 2023	THDC-TAKSHASHILA, Rishikesh
32	Training course on Hydrological Modelling Using Soil and Water Assessment Tool (SWAT): Theory and Hands-on	December 29-30, 2023	NIH Roorkee
33	Hands-On Training of ICP-MS and GC-MS for Scientific Cadre Officials of CWC	January 08-12, 2024	NIH Roorkee
34	Training Course on "ArcGIS Enterprise Management" sponsored by World Bank	Jan 15-17, 2024	NIH Roorkee
35	Training course on Application of isotopes in water resources investigations and management	January 15-20, 2024	NIH, Roorkee
36	Workshop on "Basics of Hydrology and Importance of Water Resources Management in the Context of Sivagangai District"	January 19-20, 2024	Karaikudi Tamil Nadu
37	Training on 'Tools and Techniques for Springshed Management'	January 22-27, 2024	NIH Roorkee
38	Hands-On Training of ICP-MS and GC-MS for Scientific Cadre Officials of CWC	February 19-23, 2024	NIH Roorkee
39	Training on Cryosphere, Climate Change and Hazards (CCCH): Theory and Practice.	February 19-23, 2024	NIH-WHRC, Jammu.
40	Workshop on capacity building "Climate resilient hydrological systems in Uttarakhand"	March 1, 2024	Dehradun
41	Training on 'Greywater Management of Bihar State' in association with PSI, Dehradun and Aga Khan foundation, Patna	March 06-07, 2024	Hotel Crown Plaza, Patna
42	Training course on "Tools and techniques for hydrological investigations".	March 11-15, 2024	NIH Roorkee
43	Training course on "Hydrological Modelling using HEC-HMS"	March 11-15, 2024	CFMS NIH Patna
44	Training program on "Hydrological Modelling using HEC-HMS'	March 11-15, 2024	NIRD&PR, NERC Guwahati
45	Brainstorming on Mountain Hazards and Mitigation.	March 11, 2024.	NIH-WHRC, Jammu
46	SSAP Progress Review of 16 States/UTs under NWM	March 13, 2024	online mode
47	Training on "Hydrological Modelling on impact assessment related to mining activity" sposored by CMPDI.	March 18-22, 2024	NIH Roorkee
48	Workshop on capacity building "Climate resilient hydrological systems in Himachal Pradesh"	March 21, 2024	Shimla

49	Workshop on 'Preparation of district action plans for sustainability of drinking water sources in priority districts under Jal Jeevan Mission, Uttarakhand'	March 22, 2024	JJM-SWSM, Dehradun
50	Brainstorming session on "Efforts at local level to solve water and sanitation crisis"	March 22, 2024	CFMS Patna
OTHER ACTIVITIES			
1	Water Quality Lab visit by Diploma students of Civil Engineering students, Andhra Polytechnic, Kakinada	June 26, 2023	RC-Kakinada
2	Training cum final presentation of the project entitled "Study of Various Possible Scenarios for Understanding the Long-term Effect of en-route Canal Irrigation for Proposed Mahanadi-Godavari Link" in the 2nd Meeting of Sub - Committee for "Comprehensive Evaluation and System Studies on Interlinking of Rivers", Chaired by Sh. A. B. Pandya, Secretary General, ICID and former Chairman, CWC.	June 30, 2023	NIH, Roorkee
3	Water Quality Lab visit by B.Tech. Civil Engineering students of Vishnu College, Bhimavaram and Aditya College, Surampalem	July 10, 2023	RC-Kakinada
4	Water Quality Lab visit by the Govt. Degree College Students (B.Sc.), Pithapuram	March 12, 2024	RC-Kakinada