

AGENDA AND AGENDA NOTES
79th meeting of the
Technical Advisory Committee (TAC) of N.I.H.

APPENDICES
(Vol.-II)

July 14, 2025
at 10:30 Hours
Committee Hall, 2nd Floor,
Central Water Commission, Sewa Bhawan,
New Delhi



NATIONAL INSTITUTE OF HYDROLOGY
ROORKEE – 247 667

MINUTES OF THE 78TH TAC MEETING

Minutes of 78th meeting of Technical Advisory Committee of National Institute of Hydrology, Roorkee held on 8th August, 2024 through Hybrid mode

The 78th meeting of the Technical Advisory Committee (TAC) of the National Institute of Hydrology (NIH), Roorkee was held through Hybrid mode on 8th August, 2024. The meeting was Chaired by Shri Kushvinder Vohra, Chairman, Central Water Commission (CWC). The list of the participants is given in Annexure-1.

Dr. M. K. Goel, Director, NIH first welcomed the Chairman and members of the TAC and other invitees to the meeting. After around of brief introduction of members, invitees and Divisional Heads of NIH, the Director invited the Chairman for his opening remarks. The Chairman emphasized on the importance of this meeting and requested the members to give their observations, suggestions and remarks on the agenda items and scientific activities of the Institute. Subsequently, he requested to take up the agenda items of the meeting. The Member- Secretary and Head, Technical Cell of NIH, Dr. Sanjay Kumar, Scientist "F" then took-up the agenda items of the meeting. The suggestions/observations of the members on the agenda items are summarized in Annexure-II. The agenda-wise discussions during the meeting are as follows:

ITEM NO. 78.2: Confirmation of the minutes of 77th meeting of TAC

The Member-Secretary informed that minutes of the 77th meeting of TAC, held on February 19, 2024 through online mode, were circulated to all the members and invitees on 7th August, 2024. No comments were received from the members and the minutes were confirmed by the TAC.

ITEM NO. 78.3: 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 77th meeting. He informed that TAC had recommended five action points during the meeting. The point-wise details of the actions taken by the Institute were elaborated in the meeting. Following suggestions/observations were made by the members:

S. No. 2 & 4: The Chairman suggested to finalize the MoU (related to the comparison of different discharge measurement techniques) between CWC, NIH, and CWPRS at the earliest. It was informed that draft MoU has been prepared and it is presently being reviewed by CWPRS. Further, it was informed that 5 CWC gauging locations have been identified for detailed discharge measurement by various contact and non-contact-based techniques. The Chairman suggested to increase the number of test sites in the future.

S. No. 3: With regard to the trainings of Scientists of NIH in various disciplines, it was informed that a Training Cell has been set-up in NIH in this year which is monitoring the training activities of NIH Scientists as well as the training courses conducted for various water resources professionals and research scholars. The Chairman emphasized to develop a structured framework so that trainings to different Scientists can be imparted on emerging advanced topics as well as in their areas of specializations with greater focus on hands-on sessions/exercises.

Further, a mechanism may be devised to follow up with the trained officers to get feedbacks on the usefulness of the trainings and to plug shortcomings, if any.

ITEM NO. 78.4: Status of the work programme for the year 2023-24

The Member-Secretary briefly mentioned about the studies carried out by the Institute during the year 2023-24. He presented the list of 22 studies, including internally and sponsored studies, which were completed during 2023-24. The details of the publications by the Institute in various international/national journals and conferences were also provided. It was mentioned that a total of 50 training courses/workshops/brain storming sessions were organized/attended by the Scientists of the Institute during the year.

The Chairman appreciated the achievements made by NIH during the year and desired that a 1-2 days meeting detailing the outcome of various studies may be organized in near future at NIH, Roorkee. Director, NIH informed that it is planned to organize a 1-2 days workshop at NIH, Roorkee showcasing the major achievements of the Institute to various related departments of Central/State Govt. and Academic Institutes. The Member-Secretary emphasized that various studies of different Divisions are detailed in working group meeting of the Institute and members of TAC can join such meeting for comprehensive inputs. TAC noted the progress of the studies/projects of the Institute during the year 2023-24. Comments/suggestions from other members are summarized in Annexure-II including the comments received through mail.

NIH had planned for brief presentations of various Divisions and Regional Centres showcasing their major areas of work during the year. The Chairman suggested to send the presentations to all the TAC members for their information and any clarification.

ITEM NO. 78.5: Proceedings of the Working Group and Regional Coordination Committees (RCC)

The Member-Secretary briefly mentioned about the 54th meeting of the Working Group of NIH which was held during 22-23 February, 2024 and the RCC meetings held in different Regional Centers at different times. During these meetings, the Working Group/RCC members reviewed the progress of studies for the year 2023-24 and recommended the work program for the year 2024-25. The TAC noted the proceedings of 54th WG and various RCC meetings of different Regional Centres.

ITEM NO. 78.6: Work Program for the year 2024-25

The Member-Secretary briefly informed about the proposed work programme of the Institute for the year 2024-25 which was discussed and recommended during the 54th Working Group meeting and various RCC meetings of NIH. The TAC approved the work programme of the Institute for the year 2024-25 is presented in Annexure - III.

ITEM NO. 78.7: Major projects and activities

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 & MoJS
2. Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS) funded by DST.

The Member-Secretary briefly mentioned about the various activities undertaken under these projects. The Chairman suggested to have detailed presentations on the activities of Centre of Excellence for Hydrological Modeling (CEHM) and the IC-EcoWS project in the next meeting of TAC. It was informed that the same would be covered in the National Workshop which is planned to be organized by the end of this year to showcase the major activities of NIH.

ITEM NO. 78.8: Reporting Items

The Member-Secretary informed that the NIH has completed 14 consultancy projects and 101 Consultancy Projects are currently ongoing during the year 2023-24, as sponsored by various agencies. The Chairman enquired about the revenue generated by NIH during last five years. It was informed that the data would be compiled and presented in the next meeting.

ITEM NO. 78.9: Additional items with the permission of the Chair

No such items were discussed.

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

List of Participants in the 78th Meeting of TAC of NIH

1.	Sh. Kushvinder Vohra, Chairman, CWC	In Chair
2.	Sh. Bhopal Singh, Member (D&R), CWC	Member
3.	Sh. Manoj Tiwari, CE, HSO, CWC	Member
4.	Dr. M. K. Goel, Director, NIH	Member
5.	Prof. K. V. Jayakumar, IIT, Dharwad	Member
6.	Prof. M. K Jain, DoH, IIT, Roorkee	Member
7.	Dr. Suhas Wani, IRRI, SARC, Varanasi	Member
8.	Prof. Rohit Goyal, Civil Engg. Dept., MNIT, Jaipur	Member
9.	Prof. Amp Sarma, IIT Guwahati	Member
10.	Ms. Manjusha Mishra, NHPC	Member
11.	Dr. Sanjay Kumar, Sc. F & Head, Technical Cell, NIH	Member-Secretary

Invitees

1. Dr. A. K. Lohani, Sc. G & Head, SWH Div., NIH, Roorkee
2. Dr. Y. R. S. Rao, 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. B. Venkatesh, Sc. G & Head, HRRC-Belagavi
8. Dr. Pankaj Mani, Sc. G & Head, CFMS-Patna
9. Dr. M. S. Rao, Sc. G, NIH, Roorkee
10. Dr. Ravi Galkate, Sc. F & Head, CIHRC-Bhopal
11. Dr. R. K. Jaiswal, Sc. F, NIH, CIHRC-Bhopal
12. Dr. P. C. Nayak, Sc. F, NIH, Roorkee
13. Dr. Archana Sarkar, Sc. F, NIH, Roorkee
14. Dr. M. K. Sharma, Sc. F, NIH, Roorkee
15. Dr. Soban Singh Rawat, Sc. F, NIH, Roorkee
16. Dr. Sanjay Kumar Sharma, Sc. E, NERC-Guwahati
17. Dr. P. G. Jose, Sc. E & Head, WHRC-Jammu
18. Dr. M. K. Nema, Sc. E, NIH, Roorkee
19. Dr. R. V. Kale, Sc. E, NIH, Roorkee
20. Shri J.P. Patra, Sc. E, NIH, Roorkee
21. Dr. L. N. Thakural, Sc. E, NIH, Roorkee
22. Dr. Sumant Kumar, Sc. E, NIH, Roorkee
23. Dr. Rajesh Singh, Sc. E, NIH, Roorkee
24. Dr. Ashwini A. Ranade, Sc. D, NIH, Roorkee
25. Dr. P. K. Mishra, Sc. D, NIH, Roorkee
26. Dr. Vinay K. Tyagi, Sc. D, NIH, Roorkee
27. Dr. S. M. Pingale, Sc. D, NIH, Roorkee
28. Dr. Sunil Gurrapu, Sc. D, NIH, Roorkee

29. Dr. Vishal Singh, Sc. D, NIH, Roorkee
30. Ms. Shashi P. Indwar, Sc. D, CIHRC-Bhopal
31. Dr. Tripti M., Sc. D, NIH, Roorkee
32. Dr. Prasanta K. Sahoo, Sc. D, NIH, Roorkee
33. Dr. Luvkush K. Patel, Sc. D, NIH, Roorkee
34. Dr. Surinaidu Lagudu, Sc. D, NIH, Roorkee
35. Dr. Kapil Kesarwani, Sc. D, NIH, Roorkee
36. Dr. Surinaidu Lagudu, Sc. D, NIH, Roorkee
37. Dr. Nitesh Patidar, Sc. C, NIH, Roorkee
38. Dr. Deepak S. Bisht, Sc. C, NIH, Roorkee
39. Dr. Akshaya Verma, Sc. C, NIH, Roorkee
40. Dr. Umesh K. Singh, Sc. C, NIH, Roorkee
41. Dr. Kuldeep Sharma, Sc. C, NIH, Roorkee
42. Dr. Ajit K. Behera, Sc. C, NIH, Roorkee
43. Dr. Pravin R. Patil, Sc. C, NIH, Roorkee
44. Dr. Sukant Jain, Sc. C, NIH, Roorkee
45. Dr. Sushindra K. Gupta, Sc. C, NIH, Roorkee
46. Dr. Ajay Ahirwar, Sc. C, NIH, Roorkee
47. Er. Ruchir Patidar, Sc. B, NIH, Roorkee
48. Dr. Satendra Kumar, Sc. B, NIH, Roorkee.
49. Sh. Rajat Kumar, Sc. B, NIH, Roorkee
50. Dr. Shailendra Kumre, Sc. B, NIH, Roorkee
51. Sh. Pintu K. Gupta, Sc. B, NIH, Roorkee
52. Sh. Harsh Upadhyay, Sc. B, NIH, Roorkee
53. Dr. Amit Pandey, Sc. B, NIH, Roorkee
54. Sh. Vipin Kumar Agarwal, Sc. B, NIH, Roorkee
55. Sh. Rajesh Agarwal, Sc. B, NIH, Roorkee

Annexure - II

Gist of major discussion points by the TAC members

S.No.	Member	Suggestion(s)
1.	Sh. Kushvinder Vohra, Chairman, CWC	• Emphasized for a long-term study. Enquired about the scope, objectives, and individual components of the Yamuna basin study. He suggested to involve other Institutes (CWC, CWGB, NRSC, NMCG) and have a brain-storming session involving YBO of ewe and various stakeholders. • Suggested to invite representatives from NMCG, CGWB, CWPRS, and NRCD to TAC/WG/RCC meetings to avoid duplication. • Enquired about the outcome of IC-EcoWS project and their ability to remove toxicants.
2.	Prof. Rohit Goyal, MNIT Jaipur	• Suggested to identify some cities for urban flood studies and artificial recharge impact assessment on GW levels.
3.	Sh. Bhopal Singh, Member (D&R), CWC	• Enquired about the latest technology updates with regard to regional flood frequency analysis and suggested to take up some studies in collaboration with CWC.
4.	Porf. K.V. jayakumar IIT-Dharwad	• Suggested for the active participation of WALMI and WTC in NIH activities for their wider dissemination and use.
5.	Prof. Arup Sarma IIT-Guwahati	• Remarked on the constructed wetlands and their performance.
6.	Prof. M. K. Jain, DoH, IIT - Roorkee	• Informed about the measurement of discharge using non- contact techniques in Upper Ganga basin in collaboration with CWC.

**MINUTES OF THE 55TH WORKING GROUP MEETING
(April 28-30, 2025)**

National Institute of Hydrology, Roorkee

Minutes of the 55th Meeting of NIH Working Group (28-30 April, 2025)

The 55th meeting of NIH Working Group (WG) was held during 28-30 April, 2025 at Roorkee under the Chairmanship of Dr. M. K. Goel, Director (NIH). A list of participants of meeting is given in Annexure-I.

Item No. 55.1: Opening Remarks by the Chairman

The Chairman welcomed the WG members and the Scientists of NIH. He informed that the objective of this meeting is to review the progress of 2024-25 and to formulate the work program for 2025-26. 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	Develop an Excel-based research database from IDR (Institutional Digital Repository or other Reports) to catalog ongoing and completed research projects, thereby preventing duplication of work. Create a central repository of all Institutes research papers for easy access and knowledge sharing. Integrate all results of laboratory-analyzed data into a structured and efficient retrieval system. Software like Lab-Pro, which is specially developed to integrate data of Soil and Water Lab, should also be used in other labs of NIH to integrate their data. A High-Level Technical Committee should review research concepts and problematic areas before they are proposed to the Working Group for discussion or approval.
2.	Sh. Sudhindra Mohan Sharma	Enhance visibility of completed studies through mass media and social media, including short documentary films and visual storytelling. Explore opportunities to monetize research studies through knowledge services, consultancy, or collaborations, with appropriate recognition of their impact. Ensure that each research outcome highlights sustainability points and real-world societal relevance. Emphasize presentation uniformity in terms of design, formatting, and clarity to improve comprehension and professional appeal.
3.	Dr. R. K. Singh	Mandate the preparation of research notes by Principal Investigators (PIs) and Co-PIs to document objectives, progress, and deliverables. Adopt a comprehensive budgeting model integrated with Decision Support Systems like DSS-PM, covering all research aspects. Prioritize publications in reputed, peer-reviewed journals, making it a requirement for all major research outputs.

S. No.	Member	Suggestion(s)
4.	Dr. (Mrs.) Sadhana Malhotra	Streamline presentation slides by limiting content per slide, focusing on key messages and visual clarity. Encourage regular training in soft skills such as time management, teamwork, presentation skills, and effective communication, especially for young researchers and project teams.
5.	Prof. Ramakar Jha	Various suggestions/observations on completed/ongoing/new studies have been included in the minutes of respective divisions.
6.	Dr. Praveen Thakur	Various suggestions/observations on completed/ongoing/new studies have been included in the minutes of respective divisions.
7.	Dr. S. S. Grewal	Various suggestions/observations on completed/ongoing/new studies have been included in the minutes of respective divisions.

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

Item No. 55.2: Confirmation of Minutes of 54th Meeting of Working Group

The 54th meeting of the Working Group was held during 22-23 February, 2024. The minutes of the meeting were circulated to all the members and invitees vide letter No. **RMOD/WG/NIH-10 dated 15 May, 2024**. The members confirmed the minutes of the 54th Working Group meeting.

Item No. 55.3: Actions Taken on Decisions/Recommendations of the Previous Working Group Meeting

Dr. Sanjay Kumar, Scientist F & Head (Technical Cell) and Member Secretary gave a brief account of the actions taken on the recommendations/ decisions of the 54th Working Group meeting. He mentioned that details of these action taken will be elaborated during the presentation of respective divisions.

Item Nos. 55.4 & 55.5: Presentation and Discussion on the Status and Progress of Work Program for Year 2024-25 and Finalization of Work Programme for Year 2025-26

The Member-Secretary requested the respective Divisional Heads to present the progress of studies carried out during 2024-25 and also to present the proposed studies for the year 2025-26. Accordingly, the progress of various studies and sponsored projects, and proposal for new studies and projects during 2025-26, were presented by all Scientific Divisions during the three-day deliberations of the Working Group. The outcome of the Division-wise study/project presented during the meeting are detailed in the following.

Centre for Cryosphere and Climate Change Studies (C4S)

The overview of the technical activities of the 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. Dr. Singh also informed that a **National Monitoring System for Himalayan Cryosphere (NaMoH)** portal has been developed by the Centre and a Spring Cell has been created under the Centre. 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 the Year 2024-25

S. No.	Title of Project/Study	Recommendations/ Suggestions
Internal Studies (Completed)		
1	Investigation on occurrences of extreme rain events across Northwest Himalaya in relation to global atmospheric thermal and circulation changes Study Group: Ashwini Ranade (PI), P K Mishra, Sunil Gurrapu Duration: 3 Years (April 2022 – March 2025) Status: Completed	Members appreciated the work and proposed to include a summary of key findings in the project report in a way relevant to stakeholders in the disaster management and climate change policy makers. The members also encouraged to publish the findings in high-quality journal.
2	Climate Change Scenarios for Andhra Pradesh and its impact on streamflow and groundwater levels in Pennar River Basin Study Group: Sunil Gurrapu (PI), YRS Rao, RV Ramana, Nitesh Patidar, Tvna Kumar, CE, WRD, GoAP Duration: 2 Years (April 2022 – March 2024) Status: Completed	The study was briefly described.
3	Assessment of Hydrological Extremes and Impact on Future Water Availability in Pennar River Basin under Changing Climate Study Group: Sunil Gurrapu (PI), Surjeet Singh, Vishal Singh, YRS Rao, RV Ramana, Madhusudan Thapliyal, TVNAR Kumar, CE, WRD, GoAP Duration: 1 Year (April 2024 – March 2025) Status: Completed	The study was briefly described.
4	Early Signatures of 21 st Century on Snow Cover Dynamics in Zaskar River Basin, Ladakh	The study was briefly described.

S. No.	Title of Project/Study	Recommendations/ Suggestions
	Study Group: DS Bisht (PI), PG Jose Duration: 3 Years (July 2021- June 2024) Status: Completed	
5	Comparative Analysis of Fine-scale Satellite & Reanalysis Precipitation Products in Upper Ganga Basin using Multi-Criterion Decision-Making Study Group: DS Bisht (PI), MK Goel Duration: 2 Years (June 2022- June 2024) Status: Completed	No specific comments.
6	Ascertaining the efficacy of use of State-of-the-art technologies for spring mapping and sustainability of springs through suitable interventions Study Group: SS Rawat (PI), Sudhir Kumar, SM Pingale, PK Mishra, DS Bisht, Rajesh Singh Duration: 3 Years (April 2022 – March 2025) Status: Completed (draft report by May, 2025)	No specific comments.
Internal Studies (Ongoing)		
7	Geo-Hydro-Chemical and Isotopic Aspects of occurrence of Springs: A case study from the major settlement areas of Bhagirathi basin, Uttarakhand, India PI: Dr. S. S. Rawat	No specific comments.
8	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 PI: Dr. Vishal Singh	No specific comments.
9	Monitoring and Modelling of the Gangotri glacier catchment under different Climate Scenarios PI: Dr. Luvkush Kumar Patel	Dr. Bhishm Kumar suggested to include isotopic observations and comparing results with the past data for better assessment of contributions of melt-runoff.

S. No.	Title of Project/Study	Recommendations/ Suggestions
10	Updation of Glaciers and Glacial Lakes in Indian Himalayan Region PI: Dr. Surjeet Singh	This study was dropped as Space Application Centre (SAC) is already working on this aspect.
11	Glacio-hydrological and GLOF investigations over the Triloki glacier, Bhaga basin, Western Himalaya PI: Dr. Luvkush Kumar Patel	No specific comments.
12	WRF-based dynamical downscaling of CMIP6 climate projections over Himalaya and surrounding Region PI: Dr. Kuldeep Sharma	No specific comments.
13	Integrated long-term monitoring of Khatling Glacier, Bhilangana basin, Uttarakhand PI: Dr. Akshaya Verma	Dr. S. S. Grewal suggested to explore the study on Hemkund Sahib glaciers.
14	A Spatially Explicit Assessment of CMIP6 General Circulation Models for Indian Himalayan Region PI: Dr. D. S. Bisht	The study was briefly described.
15	Climate change impacts on water resources availability and hydropower potential assessment in the Himalayan Satluj river basin (up to Kasol) PI: Sh. Rajat Kumar	Members suggested to incorporate sediment yield analysis by collecting data available with BBMB and also visit field to get more understanding of local water and sediment related problems.
16	Influence of Climate Change and Future Response of the Milam Glacier (Central Himalaya, India): Science – Practice – Policy PI: Dr. Kapil Kesarwani	No specific comments.
Sponsored/Collaborative Projects (Completed)		
1	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 Study Group: Dr.Vishal Singh (PI) Duration: 2.5 Years (June 2021- Sept. 2024) Status: Completed	The study was briefly described.
Sponsored/Collaborative Projects (Ongoing)		

S. No.	Title of Project/Study	Recommendations/ Suggestions
2	Assessment of glacier-climate functional relationships across the Indian Himalayan region through long-term network observations PI: Dr. Vishal Singh	The study was briefly described.
3	Isotopic & Hydrogeochemical Characterization of Hot Springs of Uttarakhand Himalayas PI: Dr. S. S. Rawat	No specific comments
4	Influence of climate change on Debris-covered Milam Glacier (Goriganga River Basin, Central Himalaya, India): Monitoring and Modelling of Physical Processes Governing Snow and Glacier-fed Watershed Dynamics PI: Dr. Kapil Kesarwani	The study was briefly described.
Consultancy Studies (Completed)		
1	System Studies for Proposed Farakka-Sundarban Link Project	Completed.
New Internal Studies		
1	Exploring Atmospheric conditions and Triggering Mechanisms of Cloudburst Events in the Northwestern Himalayas PI: Dr. Ashwini Ranade	Members suggested to explore possible collaborations with other institutes like IMD and IITM.
2	Seasonal Variability of SedimentFlux in Meltwater Streams of Himalayan Glacier System PI: Sh. Jatin Malhotra	Members suggested to redefine the title and objectives of the study to align with the scope of C4S.

Recommended Work Program of C4S for the Year 2025-26

S. No.	Title of Project/Study	Study Team	Duration	Funding
Internal Studies (11)				
1	Geo-Hydro-Chemical and Isotopic Aspects of occurrence of Springs: A case study from the major settlement areas of Bhagirathi basin, Uttarakhand, India	S S Rawat (PI) Suhas Khobragade M K Sharma M S Rao S M Pingale P K Mishra	3 Years (04/23 - 03/26) Ongoing	NIH
2	Real time monitoring of snow-glacier related parameters and Ensemble	Vishal Singh (PI) Surjeet Singh	5 Years (03/23-02/28)	NIH

S. No.	Title of Project/Study	Study Team	Duration	Funding
	Hydrological Modeling (EHM) to study the Triloki Group of Glaciers and Khatling glaciers part of Western Himalaya, India under climate change scenarios	Sunil Gurrapu Lavkush Patel Akshaya Verma Madhusudan Thapliyal	Ongoing	
3	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	3 years (04/23-03/26) Ongoing	NIH
4	Glacio-hydrological and GLOF investigations over the Triloki glacier, Bhaga basin, Western Himalaya	Lavkush Kr Patel (PI) Akshaya Verma Vishal Singh Surjeet Singh	3 years (03/24-03/27) Ongoing	NIH
5	WRF-based dynamical downscaling of CMIP6 climate projections over Himalaya and surrounding Region	Kuldeep Sharma (PI) Ashwini Ranade Sahidul Islam, Associate Director, CDAC, Pune	3 years (04/24-03/27) Ongoing	NIH
6	Integrated long-term monitoring of Khatling Glacier, Bhilangana basin, Uttarakhand	Akshaya Verma (PI) Vishal Singh Sunil Gurrapu Lavkush Patel Surjeet Singh	4 years (04/24-03/28) Ongoing	NIH
7	A Spatially Explicit Assessment of CMIP6 General Circulation Models for the Indian Himalayan Region	Deepak Singh Bisht (PI) Nitesh Patidar S S Rawat Surjeet Singh	2 years (04/24-03/26) Ongoing	NIH
8	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	2 years (04/24-03/26) Ongoing	NIH
9	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 D S Bisht Akshaya Verma Madhusudan Thapliyal	3 years (04/24-03/27) Ongoing	NIH
10	Exploring Atmospheric conditions and Triggering Mechanisms of Cloudburst Events in the Northwestern Himalayas	Ashwini Ranade (PI) Kuldeep Sharma	3 years (04/25-03/28) New	NIH
11	Seasonal Variability of Sediment Flux in Meltwater Streams of Himalayan Glacier System	Jatin Malhotra (PI) Vishal Singh Kapil Kesarwani Sumit Rai, Sc D, GBPIHE Madhusudan Thapliyal	3 years (04/24-03/28) New	NIH
Sponsored/Collaborative Projects				

S. No.	Title of Project/Study	Study Team	Duration	Funding
1	Assessment of glacier-climate functional relationships across the Indian Himalayan region through long-term network observations	Vishal Singh (PI)	3 years (12/23-11/26) Ongoing	Sponsored by NMHS-GBPNiHE
2	Isotopic and hydrogeochemical characterization of hot springs of Uttarakhand Himalayas	S S Rawat (PI) Tripti Muguli Amit Pandey Akshaya Verma	3 years (09/24-08/26) Ongoing	Sponsored by UCOST
3	Influence of climate change on Debris-covered Milam Glacier (Goriganga River Basin, Central Himalaya, India): Monitoring and Modelling of Physical Processes Governing Snow and Glacier-fed Watershed Dynamics	Kapil Kesarwani (PI)	3 years (02/23-02/26) Ongoing	Sponsored by DST
4	Impact of Climate Change on the Glaciers in Indus basin and its Impact on water availability over the coming decades	Vishal Singh (PI) Surjeet Singh Deepak Singh Bisht Kuldeep Sharma Akshaya Verma Sachchidanand Singh, WHRC, Jammu	3 years (04/25-03/28) New	Sponsored by DoWR, RD&GR, MoJS
Consultancy Studies (1)				
1	Flood Plain Zoning of Khokhari River (Length ~45.5) for Districts Saharanpur and Shamli Districts	Vishal Singh (PI)	6 Months (04/25-09/25) New	Sponsored by Irrigation Construction Division, Saharanpur (UP)

Environmental Hydrology Division

Dr. Y. R. Satyaji Rao, Scientist 'G' & Head, presented an overview of the technical activities of the Environmental Hydrology Division (EHD). The Working Group was briefed on the scientific manpower, the status of completed and ongoing studies, consultancy projects, publications, and technology transfer initiatives. Following this, the division's scientists were invited to present the completed studies, the progress of ongoing internal studies, and the proposed new studies. The comments and suggestions provided by the Working Group members are summarized below.

Progress of Work Program for the Year 2024-25

S. No.	Study	Recommendations/Comments
Internal Projects (Completed)		
1	Title: Understanding Arsenic mobilization in groundwater of Haridwar and formulating remediation measures	Dr. Rajesh Singh presented the study's progress. The members acknowledged the quality of the

S. No.	Study	Recommendations/Comments
	Study Group: Rajesh Singh (PI), Sumant Kumar, Pradeep Kumar, M. K. Sharma, V. K. Tyagi, Kalzang Chhoden Duration: 4 Years (July 2021 – April 2025) Status: Completed	work and provided the following recommendations: • Dr. Bhishm Kumar recommended conducting isotopic analyses of precipitation, the Solani River water, and the Ganga River water to better characterize and differentiate groundwater recharge sources. He also advised using distinct symbols to represent isotope signatures from shallow and deep wells for improved data visualization. • Dr. Sudhindra Mohan Sharma suggested distinguishing between shallow and deep groundwater sampling points in graphical representations through the use of differentiated color coding.
2	Title: Simulation of Non-Point Source Pollution Processes in Song River Study Group: Pradeep Kumar (PI), M.K. Sharma, Rajesh Singh, Shakti Suryavanshi, SK Kumre Duration: 5 Years (11/19-03/25) Status: Completed	Dr. Pradeep Kumar presented the progress of the study. The members appreciated the study and recommended preparing and submitting a concise summary report to the beneficiary organization for further action.
Sponsored Projects (Completed)		
3	Title: Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS) Study Group: Rajesh Singh (PI), VC Goyal, Omkar Singh, Jyoti Patil, VK Tyagi, Kalzang Chhoden Partners: MNIT-Jaipur, IIT-Bombay, IRMA-Anand Duration: 6 Years (04/19-01/25). Sponsored by: DST Status: Completed	Dr. Rajesh Singh provided an update on the study's progress and key findings, and informed the group that the final report has been completed.
4	Title: Irrigation efficiency improvement for Shahnehar medium irrigation project Study Group: Rajesh Singh (PI), RP Pandey, Shakti Suryavanshi, SK Kumre, JP Patra Duration: 6 Years (12/17-09/24) Status: Completed	The study's progress was reported in the Working Group meeting. The PI informed that the study has been concluded and the report has been submitted to NHP.
Collaborative R&D Projects (Completed)		

S. No.	Study	Recommendations/Comments
5	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: 4 Years (07/21-03/25) Sponsored by: BHU Status: Completed	Dr. Rajesh Singh reported that the study was conducted in collaboration with partner institutions and that the final report is currently under preparation.
Internal Projects (Ongoing)		
6	Title: Hydrological Studies for the Conservation of Rewalsar Lake PI: Dr. Kalzang Chhoden	Dr. Kalzang Chhoden presented the progress of the study along with the planned future activities. The members acknowledged the quality of the work and offered the following suggestion: Prof. Ramakar Jha recommended standardizing the dissolved oxygen (DO) values to 20 °C to facilitate accurate comparison of DO levels with those observed in other high-altitude lakes.
7	Title: Comprehensive evaluation of disinfection units of STPs in Ganga basin: Formation & Control of emerging oxidation precursors. PI: Dr. Vinay Kumar Tyagi	Dr. Vinay Kumar Tyagi presented the progress of the study and future planned activities. The progress of the study was appreciated by the members and the following suggestions were made: • Prof. A. A. Kazmi recommended conducting controlled experiments using incremental chlorine dosages in the range of 5–10 ppm to evaluate disinfection efficiency and the formation of trihalomethanes (THMs). • Dr. Sudhindra Mohan Sharma suggested developing correlation graphs between chlorine dosage and free residual chlorine levels for the sewage treatment plants under study.
8	Title: Nanotechnology-enabled multifunctional materials for the detection and remediation of arsenic in contaminated water.	Dr. Prasanta Kumar Sahoo presented the progress of the study to the Working group. The members made the following suggestions:

S. No.	Study	Recommendations/Comments
	PI: Dr. P. K. Sahoo	• Dr. Sudhindra Mohan Sharma recommended exploring options to enhance cost-effectiveness and efficiency of the developed material. • Prof. A. A. Kazmi suggested evaluating the performance of existing arsenic (As) removal systems currently deployed in the field.
9	Title: Land and water management plan for rejuvenation of river Manorama PI: Dr. Shakti Suryavanshi	Dr. Shakti Suryavanshi presented the progress of the study along with the planned future activities. The members appreciated the quality of the work and provided the following suggestions- • Prof. Ramakar Jha recommended incorporating a time series analysis of rainfall and river discharge data. He also suggested analyzing concentrations of key agricultural pollutants (N, P, K) in both river and groundwater samples. • Dr. R. K. Singh suggested estimating the siltation rate in the river. • Dr. S. S. Grewal recommended considering the use of floating wetlands as a component of the proposed remedial or mitigation measures.
10	Title: Evaluation of Groundwater Quality of Tripura with emphasis on Arsenic and Fluoride PI: Dr. Rajesh Singh	Dr. Rajesh Singh reported the progress of the study and future planned activities.
11	Title: Environmental flow requirements at critical stretches of River Yamuna PI: Dr. S. K. Kumre	Dr. S.K. Kumre presented the progress of the study and outlined the planned future activities. No specific comments or suggestions were provided by the members.
12	Title: Rainfall-Runoff-Sediment yield modelling to assess water availability and sediment loads PI: Dr. Shakti Suryavanshi	Dr. Shakti Suryavanshi presented the progress of the study and future planned activities. No specific comments or suggestions were provided by the members.
Sponsored Projects (Ongoing)		
13	Title: Changing the fate of the Hindon River by evaluating the impact of agriculture on the water balance:	Dr. Sharma presented the progress on the ongoing project. Dr. Lohani enquired about the criteria of the selection of the different locations of piezometric wells along River Hindon. Dr.

S. No.	Study	Recommendations/Comments
	Developing a template for a cleaner Ganga River PI: Dr. M. K. Sharma	Sharma explained that the piezometric wells along River Hindon were drilled before and after confluence of River Hindon with tributaries as well as accessibility. In response to a query from Dr. Bhishm Kumar regarding groundwater and surface water interaction across different seasons, Dr. Sharma added that monthly monitoring is being conducted to study this aspect. The Working Group members appreciated the study.
14	Title: Development of Innovative sewage treatment technology with a minimum energy requirement PI: Dr. Vinay Kumar Tyagi	Dr. V.K. Tyagi reported the progress of the study and future planned activities.
15	Title: Bio-Hythane production from Hydrothermally pretreated OFMSW and Sewage Sludge PI: Dr. Vinay Kumar Tyagi	Dr. V.K. Tyagi reported the progress of the study and future planned activities.
16	Title: Environmental Flow Assessment for Chambal, Sone, Damodar and Tons Rivers at Critical Reaches PI: Dr. Pradeep Kumar	Dr. Pradeep Kumar reported the progress of the study and future planned activities.
Collaborative R&D Projects (Ongoing)		
17	Title: SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resources recovery for India Dr. Vinay Kumar Tyagi (Co-PI) Prof. A. A. Kazmi (PI, IITR) Duration: 4 Years (03/20-02/24)	Dr. Vinay Kumar Tyagi informed that the study is being conducted in collaboration with IIT Roorkee. He reported that the study is nearing completion, and the final report will be submitted to the sponsor.
Internal Studies (New)		
18	Title: Fate and transport of agricultural pollutants in unsaturated zones of Yamuna River Basin PI: Dr. Poonam Rana	Er. Poonam presented the proposed plan of study. The Working Group members agreed on the objectives and the necessity of the proposed study. The following suggestion was made:

S. No.	Study	Recommendations/Comments
		Dr. Bhishm Kumar recommended utilizing existing data to delineate potential hotspot regions and validating these findings with field data.
19	Title: Evaluating the impact of toilets on groundwater and surface water in diverse hydrogeological and climatic conditions Study Group: Y. R. Satyaji Rao (Lead PI), Rajesh Singh (PI), Vinay Kumar Tyagi, Kalzang Chhoden, Shakti Suryavanshi, Poonam Team of scientists from NIH-WHRC, NIH-NWHC, NIH-CFMS, NIH-NERC, NIH-HRRC, NIH-DRC	Dr. Y. R. S. Rao presented the proposed plan of activities for the study. The members appreciated the proposed work and offered the following suggestion: • Dr. Bhishm Kumar recommended considering groundwater levels and soil types when selecting study sites. • Prof. A. A. Kazmi suggested utilizing isotopic techniques to delineate the sources of pollution, including greywater, cattle waste, and agricultural return flow. • Prof. Ramakar Jha advised referring to previous studies related to twin pit latrines for relevant insights.
20	Title: Nitrate-organic-bacteria nexus in mobilization of naturally occurring arsenic in groundwater Study Group: Rajesh Singh (PI), YRS Rao, Sumant Kumar, VK Tyagi, MK Sharma, Kalzang Chhoden, PK Sahoo, Poonam, Prashant Rai (CGWB, DDN)	The study was postponed due to the number of ongoing studies within the division, and it was suggested that this important study be undertaken at a later stage.

Recommended Work Program of EHD for the Year 2025-26

S. No.	Study Title	Study Team	Duration/Status	Funding
Sponsored R&D Projects (Ongoing)				
1.	Changing the fate of the Hindon River by evaluating the impact of agriculture on the water balance: Developing a template for a cleaner Ganga River	M K Sharma (PI)	5 Years (2022-2027) Status: Ongoing	DST
2.	Development of Innovative sewage treatment technology with a minimum energy requirement	Vinay K. Tyagi (PI) Rajesh Singh (Co-PI) Collaborators: IIT Roorkee -Prof. C.S.P Ojha -Prof. A A Kazmi	3 yr (08/24-07/27) Status: Ongoing	Tehri Hydro Development Corporation Ltd.
3.	Bio-Hythane production from Hydrothermally pretreated OFMSW and Sewage Sludge	Vinay K. Tyagi (PI) Rajesh Singh (Co-PI) Collaborators: IIT Roorkee -Prof. C.S.P Ojha -Prof. A A Kazmi	3 yr (08/24-07/27) Status: Ongoing	Tehri Hydro Development Corporation Ltd.
4.	Environmental Flow Assessment for Chambal, Sone, Damodar and Tons Rivers at Critical Reaches	Pradeep Kumar (PI) and team of scientists from EHD, GWHD, C4S, WRSD Collaborators: WII, Dehradun (UK), ICAR-CIFRI, Barrackpore (WB)	3 Years (12/24-11/27) Status: New	NMCG
Collaborative R&D Projects (Ongoing)				
1.	SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resources recovery for India	V K Tyagi (Co-PI) A A Kazmi (PI, IITR)	5 Years (03/20-06/25) Status: In-progress	DST
Internal Study (Ongoing)				
2.	Hydrological Studies for the Conservation of Rewalsar Lake	Kalzan Chhoden (PI) Rajesh Singh Y R S Rao Pradeep Kumar V K Tyagi	3 Years (04/23-03/26) Status: In-Progress	NIH

S. No.	Study Title	Study Team	Duration/Status	Funding
		S D Khobragade Shakti Suryavanshi S K Kumre D S Malik, GKU, Haridwar		
3.	Comprehensive evaluation of disinfection units of STPs in Ganga basin: Occurrence and control the formation of emerging oxidation precursors	V K Tyagi (PI) Rajesh Singh M K Sharma Pradeep Kumar J P Patra Kalzang Chhoden Y R S Rao	3 Years (04/23-03/26) Status: In-Progress	NIH
4.	Nanotechnology-enabled multifunctional materials for the detection and remediation of arsenic in contaminated water	P K Sahoo (PI) Rajesh Singh M K Sharma Pradeep Kumar V K Tyagi Sumant Kumar Kalzang Chhoden	3 Years (04/24-03/27) Status: In-Progress	NIH
5.	Land and water management plan for rejuvenation of river Tilodki Ganga, Ayodhya	S Suryavanshi (PI) S K Kumre R P Pandey Pradeep Kumar Rajesh Singh M K Sharma V K Tyagi	3 Years (04/24-03/27) Status: In-Progress	NIH
6.	Evaluation of groundwater quality of Tripura with emphasis on arsenic and fluoride	Rajesh Singh (PI) V K Tyagi M K Sharma P K Sahoo Kalzang Chhoden Shakti Suryavanshi S K Sharma Swapnali Barman W R Singh	3 Years (04/24-03/27) Status: In-Progress	NIH
7.	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) Status: In-Progress	NIH

S. No.	Study Title	Study Team	Duration/Status	Funding
8.	Environmental flow requirements at critical stretches of River Yamuna	S K Kumre (PI) Pradeep Kumar Shakti Suryavanshi Rajesh Singh	3 Years (04/24-03/27) Status: In-Progress	NIH
9.	Rainfall-Runoff-Sediment yield modelling to assess water availability and sediment loads	S Suryavanshi (PI) S K Kumre Pradeep Kumar	3 Years (04/24-03/27) Status: In-Progress	NIH
Internal Study (Proposed)				
10.	Fate, transport, and health risks of agricultural pollutants in the Yamuna River Basin: An integrated modelling and experimental approach	Poonam Rana (PI) Y R S Rao M K Sharma Pradeep Kumar Rajesh Singh V K Tyagi Kalzang Chhoden Shakti Suryavanshi S K Kumre	3 Years (04/25-03/28) Status: Proposed	NIH
11.	Evaluating the impact of toilets on groundwater and surface water in diverse hydrogeological and climatic contexts without sewage treatment facilities	Y R Satyaji Rao (PI) Rajesh Singh Vinay Kumar Tyagi Kalzang Chhoden Shakti Suryavanshi Poonam	3 Years (04/25-03/28) Status: Proposed	NIH
12.	Nitrate-organic-bacteria nexus in mobilization of naturally occurring arsenic in groundwater	Rajesh Singh (PI) Y R S Rao Sumant Kumar V K Tyagi M K Sharma Kalzang Chhoden P K Sahoo Poonam Prashant Rai (CGWB, DDN)	3 Years (04/25-03/28) Status: Proposed	NIH
Consultancy Projects (Ongoing)				
13.	Preparation of District/State Action Plans for Source Sustainability of Drinking Water Supply Schemes under Jal Jeevan Mission, Uttarakhand	R P Pandey (Retd.) Rajesh Singh (PI) Pradeep Kuma, M K Sharma V K Tyagi	2 Years (10/23-07/25) Status: In-Progress	UK-JJM

S. No.	Study Title	Study Team	Duration/Status	Funding
		Kalzung Chhoden Shakti Suryavanshi S K Kumre		
14.	Site assessment for potential damage to the environment caused by pesticide manufacturing industry located at RIICO industrial area, Sotanala, Behror (Rajasthan)	M K Sharma (PI) Sumant Kumar	0.5 Year (03/25-08/25) Status: In-Progress	Rajasthan Pollution Control Board, Jaipur
15.	Hydrogeological Study of Feroze Gandhi Unchahar Thermal Power Station, Unchahar	Rajesh Singh (PI) Y R S Rao M K Sharma, Pradeep Kumar V K Tyagi Kalzung Chhoden P K Sahoo Skakti Suryavanshi S K Kumre	1.5 Year (03/25-07/26) Status: In-Progress	GCS, Roorkee
16.	Prioritization of Sub-catchments of the Song and Nayar River Catchments for Development of River Rejuvenation Plan	Pradeep Kumar (PI) Y R S Rao S S Rawat Shakti Suryavanshi S K Kumre S M Pingale	04 Month (11/24-03/25) Status: In-progress (Draft Report submitted)	Watershed Management Directorate, Uttarakhand
17.	Preparation of NGT Joint Committee Report on Solani River Catchment	Y R S Rao (PI) Pradeep Kumar V K Tyagi Rajesh Singh Shakti Suryavanshi S K Kumre	03 Month (11/24-03/25) Status: In-Progress	Uttarakhand State Pollution Control Board

Groundwater Hydrology Division

Dr. Anupma Sharma, Scientist-G and Head, Groundwater Hydrology Division (GHD), made a brief presentation about the present manpower of the division, the attached Soil-Water Laboratory and Centre of Excellence for Advanced Groundwater Research, thrust areas of the division, work program and major achievements during the year 2024–25, and the proposed work program for the year 2025-26. She informed that, in addition to significant progress in various studies and sponsored projects, work on the development of one software tool “LabPro” has been completed. The LabPro tool, which is a Laboratory Data Processing System, will be implemented in the Soil-Water Laboratory. Significant progress was reported in the major project on the Luni River Basin, which

aims to improve understanding of groundwater dynamics and inform sustainable water resource management in the region. Notably, the Groundwater Hydrology Division successfully organized the International Ground Water Conference (IGWC 2025) jointly with Hydrological Investigations Division, from 5th to 7th March, 2025 at NIH, Roorkee on the theme ‘Groundwater Vision 2047: Towards Water Security under Changing Climate’. The conference was organized in association with the Central Ground Water Board (CGWB); Association of Global Groundwater Scientists (AGGS); National Mission for Clean Ganga (NMCG); National River Conservation Directorate (NRCD); British Geological Survey (BGS), United Kingdom; Hochschule für Technik und Wirtschaft (HTW) Dresden, Germany; and KTH-Royal Institute of Technology, Stockholm, Sweden. More than 400 leading national and international experts in the field of groundwater research participated in the event.

Subsequently, detailed presentations on various studies were made by the respective Scientists (PIs) of various studies. Sponsored studies, except for one, were not presented. The recommendations/ comments of the Working Group members on these studies are summarized below.

Progress of Work Program for the Year 2024-25

S. No.	Title of Project/Study	Recommendations/Comments
Internal Studies (Completed)		
1.	Studying arsenic genesis and developing alternate water supply management strategies in Ganga basin Study Group: Sumant Kumar (PI), Surjeet Singh, Nitesh Patidar, Rajesh Singh, Gopal Krishan, M K Sharma, Vinay Tyagi, S S Rawat, P K Mishra Duration: 3 years (04/2022-03/2025) Status: Completed	• Dr. Bhishm Kumar suggested that the PI consult with him regarding the isotopic data to enhance its interpretation. • The Director, NIH suggested the PI to submit the report of the study.
2.	Conjunctive Management of Water Resources in IGNP Command Study Group: Nitesh Patidar (PI), M K Goel, Anupma Sharma, Surjeet Singh, Gopal Krishan, Sumant Kumar Duration: 2 years (04/2022-03/2024) Status: Completed	• Sh. Sudhindra K. Sharma suggested to explore if the outcomes of the study can be utilized for policy making for conjunctive use.
3.	Development of Archive of Soil Hydraulic Characteristics	• Dr. Bhishm Kumar recommended that NIH should consider implementing the LabPro system in other laboratories of the Institute.

S. No.	Title of Project/Study	Recommendations/Comments
	Study Group: Nitesh Patidar (PI), Surjeet Singh, M K Goel, Anupma Sharma Duration: 1 year (04/2023-03/2024) Status: Completed	
Internal Studies (Ongoing)		
4.	Enhancement and application of NIH_WISDOM PI: Dr. Nitesh Patidar	• The Director suggested that the model application be conducted in the Yamuna River basin instead of the Ganga basin. • Based on the Principal Investigator's request, the members recommended extending the study period until March 2026.
5.	Surface water-groundwater interactions through field techniques and hydrological modelling in Yamuna basin PI: Dr. Sumant Kumar	• Members suggested plotting the groundwater level (GWL) data alongside rainfall data to enable better interpretation of GWL fluctuations.
6.	Estimation of Soil Characteristics and Groundwater Recharge in the Luni River Basin PI: Dr. Satendra Kumar	• Dr. R. K. Singh suggested to include hydrological parameters in the study.
7.	Hydrogeochemical Evolution and role of Paleochannels on groundwater quality in the Luni Basin PI: Dr. Ajit Kumar Behera	• No specific comments were received from the members.
8.	Aquifer parameters estimation in the Luni River Basin PI: Sh. Pintu Kumar Gupta	• Sh. Sudhindra K. Sharma recommended re-verifying the aquifer parameters obtained from the CGWB brochure/ publication.
9.	Characterization and Modeling of Multi Aquifer System of LUNI River Basin in Rajasthan Under Climate and Anthropogenic Influences PI: Dr. L. Surinaidu	• No specific comments were received from the members.
Sponsored Projects (New)		
1.	Use of deep learning models to understand the impact of climate and land use changes on future groundwater	The study was briefly described.

S. No.	Title of Project/Study	Recommendations/Comments
	resources, with a focus on data scarce regions. PI: Dr. L. Surinaidu	
2.	Preparation of Status Reports of the Salinity Ingress in Coastal Area of Saurashtra and Kachchh, Gujarat State. Former PI: Dr. Anupma Sharma PI: Dr. L. Surinaidu PI: Dr. Ajit Kumar Behera	The study was briefly described.
3.	Modelling Micro-Plastic Movement through soil Matrix: A step towards Plastic waste management PI: Mrs. Anjali	No specific comments were received from the members.
Internal Studies (New)		
1.	Prediction of Groundwater levels Using Machine Learning Techniques in the Luni River Basin, Rajasthan PI: Dr. Sushindra K. Gupta	• Dr. Ramakar Jha suggested reconsidering the use of REPTree, BFTree, CART, AdaBoost-REPTree, and AdaBoost-CART models. • Dr. Ramakar Jha recommended adopting Random Forest and XGBoost, as these models are more commonly used in groundwater studies.

Recommended Work Program of GHD for the Year 2025-26

S. No.	Project	Project Team	Duration	Funding
Internal Studies				
1.	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)	NIH
2.	Surface water- groundwater interactions through field techniques and hydrological modelling in Yamuna basin	Sumant Kumar (PI) Nitesh Patidar Lagudu Surinaidu Pintu Gupta Ajit Kumar Behera Anupma Sharma Shailendra Kumre Gopal Krishan	3 years (04/24– 03/27)	NIH
Major Project with Sub-Projects S. No. 3-6 “Enhancing the Sustainability of Water Resources Through Integrated Assessment and Management Techniques in the LUNI River Basin – Rajasthan” Project Coordinator – Head, Groundwater Hydrology Division				
3.	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 Sushindra Kumar Gupta	2 years (04/24– 03/26)	NIH
4.	Hydrogeochemical Evolution and role of Paleochannels on groundwater quality in the Luni Basin	Ajit Kumar Behera (PI) L. Surinaidu Akshay Vyankat Dahiwalé Satendra Kumar Pintu Kumar Gupta Anupma Sharma M. K. Sharma, A. H. Laskar (PRL)	3 years (04/24– 03/27)	NIH
5.	Aquifer parameters estimation in the Luni River Basin	Pintu Kumar Gupta (PI) L. Surinaidu Nitesh Patidar Ajit Kumar Behera Satendra Kumar Sudesh Chaudhary Sushindra Kumar Gupta	2 years (04/24– 03/26)	NIH

S. No.	Project	Project Team	Duration	Funding
6.	Characterization and Modeling of Multi Aquifer System of LUNI River Basin in Rajasthan Under Climate and Anthropogenic Influences.	L. Surinaidu (PI) Anupma Sharma Ajit Kumar Behera Sumant Kumar Sudesh Chaudhary	3 years (04/24–03/27)	NIH
Sponsored Projects				
1.	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.	L.Surinaidu (PI from NIH) Lead agency: IIT-Hyderabad Partner: McGill University-Canada	2 years (06/23-07/25)	DST-SERB
2.	Preparation of Status Reports of the Salinity Ingress in Coastal Area of Saurashtra and Kachchh, Gujarat State	L. Surinaidu Ajit Behera Anupma Sharma Nitesh Patidar Sourabh Nema Sudesh Chaudhary Malkhan Singh Jatav (a) Madhavpur-Okha reach & Maliya-Lakhpat reach - L. Surinaidu (PI) (b) Bhavnagar-Una reach & Okha-Maliya reach – Ajit Behera (PI)	2 years (04/24–03/26) Status: Transferred from RC Jodhpur	GWRDC
3.	Modelling Micro-Plastic Movement through soil Matrix: A step towards Plastic waste management	Anjali (PI) Sunil Gurrapu Ajay Ahirwar Prof. C.S.P. Ojha (IITR)	3 years 03/24 – 02/27	THDC
Internal Studies (New)				
1.	Prediction of Groundwater levels Using Machine Learning Techniques in the Luni River Basin, Rajasthan	Sushindra Kr. Gupta (PI) Sumant Kumar L. Surinaidu Satendra Kumar Nitesh Patidar Pintu Kr. Gupta	2 years 11/24 – 03/26	Initiated internally in Nov. 2024

Hydrological Investigations Division

Dr Suhas Khobragade, Scientist-G and Head of the H. I. Division (HID) 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.

The progress of each individual study for the year 2024-25 and the proposal for the new studies was presented by the respective P.I. of the study.

Progress of Work Program for the Year 2024-25

S. No.	Title of study	Comments/suggestions
Internal Studies (Completed)		
1	Assessment of the Possible Impact of Climate Change on Evapotranspiration for Different Climatic Regions of India Study Group: Dr.SD Khobragade (PI), Dr.Vishal Singh Duration: 3 years (April 2022-March 2025) Status: Completed	Shi. S. M. Sharma suggested presenting the results of future PET as percentage change and not absolute change in the final report.
2	Sedimentation and Water Quality Study of Fulhar Lake, Pilibhit (U.P.) Study Group: Sh. Rajeev Gupta (PI), Dr. S D Khobragade, Dr. S M Pingale Duration: 2 years (April 2023-March 2025) Status: Completed	No specific comments/suggestions received.
Internal Studies (Ongoing)		
3	Runoff and Water Storage Capacity Estimation for Deciding Rainwater Harvesting Strategies PI: Dr. S. M. Pingale	Prof. Ramakar Jha recommended to use CARTOSAT 5.8 m DEM data as well.
4	Development of radiocarbon dating facility PI: Dr. Tripti Muguli	Working Group agreed to extend the activity by one year.
5	Hydrological and hydrogeological investigations in the Yamuna river basin using isotopic and geochemical techniques	Director, NIH suggested: • Additional river water samples may be collected in the u/s and d/s of major cities

S. No.	Title of study	Comments/suggestions
	PI: Dr. Tripti Muguli	like Delhi, Agra, etc. Additional groundwater samples may also be collected around major cities like Delhi, Agra, etc. at different distances from river location. Dr. Bhishm Kumar suggested that interaction of shallow and deep groundwater in the river basin at selected stations may be studied.
6	Understanding Surface Water Groundwater Interactions in the Narmada River Basin and its Hydrological Implications PI: Dr. Amit Pandey	Dr. Bhishm Kumar suggested that the anomalous isotopic signature observed in the Upper Narmada River requires verification.
7	Quantifying Current and Future Meteorological Drought Characteristics and Identifying Risk Zones in Central India PI: Sh. Ruchir Patidar	No specific comments/suggestions received.
Sponsored Studies (Completed)		
8	Partitioning Evapotranspiration into Evaporation and Transpiration fluxes using Stable Isotopes of Oxygen and Hydrogen Study Group: Dr. Gopal Krishan (PI), Dr. MS Rao Duration: 3 years (April 2021-March 2024) Status: Completed	No specific comments/suggestions received.
Sponsored Studies (ongoing)		
9	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) PI: Dr. Gopal Krishan	No specific comments/suggestions received.
Internal Studies (New)		
1	Unraveling summer monsoon and westerly influences incursions in the Himalayan basins using stable isotopes PI: Dr. Gopal Krishan	The Director suggested: - To change the title “westerly influences” to “western disturbances” - To delete the 3rd objective on “hydrological extremes”

S. No.	Title of study	Comments/suggestions
2	Isotopic and Arsenic Investigations in the Amritsar Transboundary Region PI: Dr. Gopal Krishan	- The Director suggested to change the title to “Amritsar region” in place of “Amritsar transboundary region” - Prof. Ramakar Jha suggested to check the groundwater gradient in the area. - Dr. S.S. Grewal suggested to review the work done by agriculture universities in this regard.
3	Isotopic & Geochemical Studies, Behal & Loharu Block of Bhiwani District, Haryana PI: Dr. Gopal Krishan	Dr. Bhishm Kumar suggested to use N15 isotopes to find the sources
4	Investigations of Water Sources and Hydrological Behaviour of Two Small Lakes at Sri Badrinath, Uttarakhand PI: Dr. S. M. Pingale	No specific comments/suggestions received
5	Investigations on water and sediment dynamics in a tropical ocean and its relation to climate PI: Dr. Tripti Muguli	It was suggested to taken up this study as a collaborative internal study.

Recommended Work Programme of HID for the Year 2025-26

S. No.	Project Title	Study Team	Duration	Status
Internal Studies				
1	Runoff and Water Storage Capacity Estimation Using Different Resolutions of Topographic Data for Deciding Rainwater Harvesting Strategies	S M Pingale (PI) Soban Singh Rawat S D Khobragade M K Nema Ruchir Patidar Rajeev Gupta	2 Years (04/23- 3/25) Extended till 06/25	On-going
2	Development of radiocarbon dating facility	Tripti Muguli (PI) Someshwar Rao Amit Pandey	1 year (04/24-03/25) Extended till 03/26	On-going
3	Hydrological and hydrogeological investigations	Tripti Muguli (PI) S D Khobragade	3 years (04/24-03/27)	On-going

S. No.	Project Title	Study Team	Duration	Status
	in the Yamuna river basin using isotope geochemistry	Someshwar Roa Ruchir Patidar Vipin K Agrawal Amit Pandey		
4	Understanding Surface Water Groundwater Interactions in the Narmada River Basin and its Hydrological Implications	Amit Pandey (PI) S D Khobragade Someshwar Rao Tripti Muguli	3 years (04/24-03/27)	On-going
5	Quantifying Current and Future Meteorological Drought Characteristics and Identifying Risk Zones in Central India.	Ruchir Patidar (PI) S M Pingale S D Khobragade Kuldeep Sharma	3 years (04/24-03/27)	On-going
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)	NIH, Roorkee: Gopal Krishan (PI) S Singh M S Rao BGS, UK: Dan Lapworth Alan MacDonald Daren Goody BGS, UK	5 years (12/17-11/24) Extended till 11/26	On-going
New Studies				
1	Unraveling summer monsoon and western disturbance influences incursions in the Himalayan basins using stable isotopes	NIH, Roorkee: Gopal Krishan (PI) S D Khobragade Amit Pandey IIRS-Dehradun: Praveen Thakur (PI) Arpit Chouksey	2 years (04/25 – 03/27)	New Study
2	Isotopic and Arsenic Investigations in the Amritsar Region	NIH, Roorkee: Gopal Krishan (PI) S D Khobragade Amit Pandey CGWB, Chandigarh: Amandeep Kaur Manish Srivastav Kiran Lale	2 years (04/25 – 03/27)	New Study

S. No.	Project Title	Study Team	Duration	Status
3	Isotopic & Geochemical Studies, Behal & Loharu Block of Bhiwani District, Haryana	NIH, Roorkee: Gopal Krishan (PI) S D Khobragade Ruchir Patidar Raj Kumar Dewansi CGWB, Chandigarh: Naima Akhtar Rishi Raj Sunil Kumar	1 year (04/25 – 03/26)	New Study
4	Investigations of Water Sources and Hydrological Behaviour of Two Small Lakes at Sri Badrinath, Uttarakhand	S M Pingale (PI) Ruchir Patidar Amit Pandey S D Khobragade	2 years (04/25 – 03/27)	New Study
5	Investigations on water and sediment dynamics in a tropical ocean and its relation to climate	NIH Roorkee: Tripti M. S D Khobragade BSIP, Lucknow: Gurumurthy, G.P.	1 year (04/25 – 03/26)	New Study

Surface Water Hydrology Division

Dr. A.K. Lohani, Sc G & Head, Surface Water Hydrology Division (SWHD) 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 2024-25

S. No.	Title of Project/Study	Recommendations/Suggestions
Sponsored Studies (Completed)		
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 Study Group: B. Sahoo (PI, IIT-KGP), RV Kale (Co-PI) Duration: 4 Years (July 2020- June 2024) Status: Completed	No specific action suggested.
Internal Studies (Completed)		
1.	Hydrological Study for revival and restoration of traditional water bodies in Bikaner, Rajasthan Study Group: LN Thakural, RK Jaiswal, JP Patra, PK Mishra, Nitesh Patidar, NK Bhatnagar, Jatin Malhotra, AK Chhangani Duration: 3 Years (Apr 2022 - March 25) Status: Completed	PI presented the background, objectives and the methodology and the results for the study. Data and methodology related to the objectives was discussed and presented including Trend analysis of rainfall, temperature and GW level for the Bikaner district, Surface water availability, soil loss assessment from the catchment of selected water bodies. The Water Quality Assessment for various parameters for the water bodies were presented. Moreover, significant variability in runoff across catchments from 2001 to 2020, influenced by factors like soil, vegetation, and topography, was presented. Site-specific approaches for revival and restoration of the water bodies were also presented. The queries and questions from the working group members concerning methodology and results were explained and answered.

S. No.	Title of Project/Study	Recommendations/Suggestions
2.	Review of design flood and dam break analysis of Khadakhai Dam in Odisha Study Group: JP Patra, AK Lohani, Pankaj Mani, PC Nayak, Sanjay Kumar, Jatin Malhotra Duration: 3 Years (Apr 2022- March 2025) Status: Completed	No specific action suggested.
3.	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 Study Group: RV Kale, AK Lohani, JP Patra, D Khurana Duration: 3 Years (Sept.2021- Oct. 2024) Status: Completed	The study was presented by PI of the study. The results of planform changes in the Tawi river basin during 1988 to 2022 were analysed using Landsat satellite datasets. Further, the flood inundation mapping results by both the 2D RRI and HEC-RAS models were analysed and it was concluded that the results achieved with both the hydraulic models were comparable. The queries and questions related to the methodologies were thoroughly explained and addressed. The members did not provide any specific comments or suggest any particular actions regarding the study.
4.	Estimation of confidence intervals of index flow duration curves Study Group: Sanjay Kumar, Sunil Gurrapu, LN Thakural, JP Patra Duration: 2 Years (Apr 2023 – March 2025) Status: Completed	PI presented the analysis and results under two objectives using daily discharge data at Chindnar and Polavaram gauging sites in Lower Godavari basin. The Annual Flow Duration Curves (AFDC), index flow duration curves and their 90% confidence interval have been estimated and plotted. The study also estimated the flow duration curves corresponds to different return periods (2, 5, 20, 50) for probability of exceedance and probability of non-exceedance. The queries and questions regarding methodology were explained and answered. There were no specific comments from members
5.	Hydrologic and hydraulic study for Jata Ganga river at Jageshwar dham Study Group: JP Patra, AK Lohani, Pankaj Mani, DS Bisht, SS Rawat	Member suggested to consider possible impact of sediment during the flood. It was explained that sediment/mud flow is not modelled in this study. However, free board

S. No.	Title of Project/Study	Recommendations/Suggestions
	Duration: 1 Year (July 2023 – July 2024) Status: Completed	of about 2m has been suggested for modelling error, uncertainty etc.
	Sponsored Studies (Ongoing)	
1.	Flood Plain Zone Delineation of Burhiganga - a tributary of the Ganga River from Village Dabal in Dist. Muzaffarnagar to Garmukteshwar PI: Er. J. P. Patra	Member enquired about effects of river morphology/ river bank changes. It is informed that in this study as per the requirement of sponsoring agency present river course is considered and the river alignment, cross-section are provided as per prevailing condition. It is also informed that the historical flood inundation extent (2009-2023) will also be considered.
	Internal Studies (Ongoing)	
1.	Flood Forecasting under Changing Climate Conditions - Role of Machine Learning and Conceptual/Physical based Model PI: Dr. P. C. Nayak	PI explained the objective specific outcomes from the study and stressed the supremacy of the Transformer-based ML tool in flood forecasting. No specific action was suggested.
2.	Entropy and Image Processing Based Non-Contact Discharge Monitoring Techniques: Testing and Implementation for Indian rivers PI: Dr. R. V. Kale	PI presented the outcome of field investigations for installation of the automatic water level and surface velocity radars at selected five G&D sites on Krishna and Godavari River basin and objective-wise achievements. Dr. Sandeep Goyal, a Working Group member, enquired about the applicability of radar-based techniques under turbulent flow conditions, such as those found in Himalayan river reaches. The Principal Investigator (PI) responded that these techniques are currently in the testing phase, and a detailed assessment is required before any definitive conclusions can be provided. Other queries and questions related to the methodologies were also addressed and explained. As the AWLR and SVRs will be installed at the selected five sites during May & June 2025, therefore, the extension of one year is requested which is approved by the committee. There were no specific comments from the members regarding the study.

S. No.	Title of Project/Study	Recommendations/Suggestions
3.	A Flood Forecasting Framework Coupling a High Resolution WRF Ensemble with 2D Hydrodynamics Model for Himalayan Mountainous Area. PI: Dr. R. V. Kale	PI presented the study objective wise achieved results and analysis. No specific action was suggested.
4.	Basin-scale, integrated water resources assessment through integrated hydrological modelling PI: Dr. S. Sahoo	PI mentioned the timely advancement of the project. He explained the work related to setting up the Soil and Water Assessment Tool (SWAT) hydrologic model and the results. The query about the data sources was answered. It was suggested that the accuracy of the DEM used be checked.
5.	Web based platform for IDF Design Rainfall Estimates for India PI: Sh. Sukant Jain	PI demonstrated the Beta version of app displaying the IDF curve of whole India and PMP and SPS values from PMP atlas for Ganga Basin. Also, the result on Best-fit probability distributions were presented. No specific action was suggested.
Internal studies (New)		
1.	Application of Annual Flow Duration Curves (AFDC) in Flood Flow and Low Flow Frequency Analysis PI: Dr. Sanjay Kumar	PI presented the new study, its objectives and application of AFDC in flood and low flows frequency analysis. Members suggested to use IHA software for low flow analysis. Other queries and questions from members were explained and answered.
2.	Development of Web-based Baseflow Separation Analysis Tool PI: Dr. R. V. Kale	PI of the study presented the background, objectives and the methodology of the proposed new study. No specific action was suggested.
3.	Development of Integrated Flood Analysis and Mapping System (I-FAMS) for India PI: Dr. R. V. Kale	The PI presented the proposal, objectives and deliverables on I-FAMS. No specific action was suggested.
4.	An Integrated approach for Irrigation Scheduling in a Command area PI: Dr. L. N. Thakural	PI presented the background, objectives and the methodology to be. It was also informed that this project (2025 to 2028) will be executed through the internal funds.

S. No.	Title of Project/Study	Recommendations/Suggestions
5.	Evaluating Rain-on-Grid Hydraulic Modelling for Dam Break Analysis: A Comparative Study of HEC-RAS and TUFLOW in Indian Catchments PI: Sh. Sukant Jain	The PI presented the proposal, objectives and deliverables on. No specific action was suggested.
6.	Web-Based Flood Hydrograph Estimation Tool for Hydraulic Structure Design in India PI: Sh. Sukant Jain	The PI presented the proposal, objectives and deliverables on. No specific action was suggested.

Recommended Work Programme of SWHD for the Year 2025-26

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	3 Year (July 2022 - June 2025)	NIH
2.	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 CWC: CE, KGBO, CWC External Expert: Prof. M. Perumal	1.5 Years (April 2024 to Sept. 2025)	NIH
3.	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	3 Year (April 2024 to March 2027)	NIH
4.	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 to Sept. 2026)	NIH
5.	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 to Sept 2025)	NIH

S. No.	Title of Project/Study	Study Team	Duration	Funding
Sponsored Studies (Ongoing)				
1.	Flood Plain Zone Delineation of Burhiganga a tributary of the Ganga River from Village Dabal in Dist. Muzaffarnagar to Garmukteshwar	J P Patra A K Lohani P C Nayak Sanjay Kumar S Sahoo	6 Months (Jan 2025 to Jun 2025)	Irrigation and WRD, Govt. of UP
Internal studies (New)				
1.	Application of Annual Flow Duration Curves (AFDC) in Flood Flow and Low Flow Frequency Analysis	Sanjay Kumar J P Patra R V Kale L N Thakural Soumyaranjan Sahoo	2 Years (April 2025 to March 2027)	NIH
2.	Development of Web-based Baseflow Separation Analysis Tool	R V Kale Sanjay Kumar A K Lohani M K Goel	2 Years (April 2025 to March 2027)	NIH
3.	Development of Integrated Flood Analysis and Mapping System (I-FAMS) for India	R V Kale A K Lohani M K Goel J P Patra P C Nayak	2 Years (April 2025 to March 2027)	NIH
4.	An Integrated approach for Irrigation Scheduling in a Command area	L N Thakural Sukant Jain S K Gupta Richa Pandey Sanjay Kumar Gaurav Kumar	3 Years (April 2025 to March 2028)	NIH
5.	Evaluating Rain-on-Grid Hydraulic Modelling for Dam Break Analysis: A Comparative Study of HEC-RAS and TUFLOW in Indian Catchments	Sukant Jain Chandra Prakash A K Lohani	2.5 Years (April 2025 to Sept 2027)	NIH
6.	Web-Based Flood Hydrograph Estimation Tool for Hydraulic Structure Design in India	Sukant Jain A K Lohani	1.5 Years (April 2025 to Sept 2026)	NIH

Water Resources Systems Division

Dr. A. R. Senthil Kumar, Sc. G and Head, presented an overview of the Water Resources Systems Division (WRSD) – 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. Following this, the division's scientists were invited to present the completed studies, the progress of ongoing internal studies, and the proposed new studies. The comments and suggestions provided by the Working Group members are summarized below.

Progress of Work Program for the Year 2024-25

S. No.	Title	Recommendations/ Suggestions
Sponsored/ Internal Studies (Completed)		
1.	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. Study Group: Dr. P K Mishra; Dr. P K Singh Duration: 2 years (04/21-06/23) extended up to 03/24 Status: Completed	Dr. P. K. Mishra presented the study and no specific comments/suggestions were received.
2.	Spatio-temporal Water Availability under Changing Climate and Land-use Scenarios in Wainganga River Basin Study Group: Dr. M. K. Nema; Dr. P. K. Mishra Duration: 3 years (04/22-03/25) Status: Completed	Dr. M. K. Nema presented the study and no specific comments/suggestions were received.
3.	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 Study Group: Dr. M. K. Nema; Dr. P. K. Mishra; Dr. Praveen Thakur (IIRS); Dr. P. R. Patil Duration: 3 years (04/22-03/25)	This study was briefly described.

S. No.	Title	Recommendations/ Suggestions
	Status: Completed	
Sponsored/ Internal Studies (Ongoing)		
1.	Simulation of operation of multiple reservoirs in Wainganga Basin for conservation and flood control under changing climate scenario PI: Dr. A. R. Senthil Kumar	Dr. A. R. Senthil Kumar presented the progress of the study and no specific comments/suggestions were received.
2.	ResSed – Tool development for prediction of elevation-area-capacity curves of the reservoirs PI: Dr. A. R. Senthil Kumar	Dr. A. R. Senthil Kumar presented the progress of the study as well as tool development and no specific comments/suggestions were received.
3.	Integrated operation of Bisalpur and Isarda reservoirs in Banas river basin, Rajasthan PI: Dr. Archana Sarkar	Dr. Archana Sarkar presented the progress of the study. The Chairman of the WG has suggested to work out the effect of field derived/insitu soil properties in comparison to the literature based soil properties on model (SWAT) response.
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 PI: Dr. P. K. Mishra	Dr. P. K. Mishra presented the progress of the study and no specific comments/suggestions were received.
5.	Development of rule-based integrated operation framework for the Mahanadi basin PI: Dr. P. K. Mishra	Dr. P. K. Mishra presented the progress of the study and no specific comments/suggestions were received.
6.	Assessment of Precipitation Gradients and Temperature Lapse Rates for Hydrological Modelling in a Himalayan Catchment PI: Dr. P. R. Patil	Dr. P. R. Patil presented the progress of the study and no specific comments/suggestions were received.
7.	Evaluation of Area-Design Curve to estimate sediment distribution in Indian reservoirs PI: Dr. U. K. Singh	Dr. U. K. Singh presented the progress of the study and no specific comments/suggestions were received.
8.	Water yield potential and flood risk assessment under changing climate and land use in the Teesta River basin up to Domohani	Dr. Harsh Upadhyay presented the progress of the study and no specific comments/suggestions were received.

S. No.	Title	Recommendations/ Suggestions
	PI: Sh. Harsh Upadhyay	
9.	Water resources planning and management using DSS (PM) under changing climatic and land-use conditions PI: Dr. Richa Pandey	Dr. Richa presented the progress of the study. The WG member, Dr Sudhindra Sharma recommended addition of groundwater component in the study.
Sponsored/ Internal Studies (New)		
1.	Hydrological Investigation and Climatic Trend Analysis of a Lesser Himalayan Forested Catchment PI: Dr. P R Patil	This study was briefly described.
2.	Comprehensive Reservoir Sedimentation Analysis of Major Indian Reservoirs Using Google Earth Engine PI: Dr. A. Ahirwar	Dr. A. Ahirwar proposed the study. Dr. A K Lohani, mentioned that similar kind of study is being carried out in the institute. The Chairman of the WG has suggested to consult with the concerned PI & Co-PI of the study. After discussion with the PI & Co-PI, it has been decided that this study will be proposed again based on the outcome of the ongoing study mentioned by Dr. A K Lohani.
3.	Application of Decision Support System for Planning & Management (DSS (PM)) in the Yamuna River Basin PI: Dr. A. Ahirwar	Dr. A. Ahirwar proposed the study. The WG member, Dr. Bhishm Kumar, Dr. A K Lohani suggested to modify the objective of study. As per the suggestion of the Chairman of the WG, the study area has been changed from Narmada to Yamuna River Basin.
4.	Development of Water Security Plans for Uttarakhand Under Changing Land Use and Climatic Scenarios PI: Dr. Manish K. Nema	Dr. M. K. Nema presented the proposed new study. WG members suggested to include Dr. SS Rawat, Sci.-F in study team. They indicated to take inputs from various state/central agencies such as IRI, USAC, UCOST, Uttarakhand Jal Sansthan, IIRS, etc. for accommodating and addressing their current water related issues on the study domain. Suggested to modified the title (It has been done).
5.	ET-based Irrigation Performance Assessment of a Command Area PI: Sh. Harsh Upadhyay	Dr. Harsh Upadhyay proposed the study and no specific comments/suggestions were received.

Recommended Work Programme of WRSD for the Year 2025-26

S. No.	Title	Study Team	Duration	Funding
Ongoing Sponsored/ Internal 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 K Singh 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 for sustaining water and food security: WAPRO-India	P K Mishra 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 P K Singh A R Senthil Kumar	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	3 years (04/24-03/27)	NIH
7.	Evaluation of Area-Design Curve to estimate sediment distribution in Indian reservoirs	Umesh K Singh A R Senthil Kumar M K Goel P R Patil Harsh Upadhyay	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	Harsh Upadhyay P K Singh A R Senthil Kumar P R Patil	3 years (04/24-03/27)	NIH

S. No.	Title	Study Team	Duration	Funding
	instrumentation in the Teesta River basin up to Domohani			
9.	Water resources planning and management using DSS (PM) under changing climatic and land-use conditions	Richa Pandey Ajay Ahirwar Sukant Jain A R Senthil Kumar A K Lohani	2 years (04/24-03/26)	NIH
New Sponsored/ Internal Studies				
1.	Hydrological Investigation and Climatic Trend Analysis of a Lesser Himalayan Forested Catchment	P R Patil M K Nema P K Mishra S S Rawat D S Meena (IFS) P Tomar (IFS) J Dagade (IFS)	10 months (05/25-03/26)	UKFD
2.	Comprehensive Reservoir Sedimentation Analysis of Major Indian Reservoirs Using Google Earth Engine	Ajay Ahirwar R Pandey U K Singh A R Senthil Kumar	3 years (04/25 – 03/28)	NIH
3.	Application of Decision Support System for Planning & Management (DSS (PM)) in the Narmada River Basin	Ajay Ahirwar Harsh Upadhyay R Pandey A R Senthil Kumar	3 years (04/25 – 03/28)	NIH
4.	Development of Water Security Plans for Uttarakhand Under Changing Land Use and Climatic Scenarios	Manish K Nema Vishal Singh Himanshu Joshi (GBPNIHE, Almora)	3 years (05/25 – 03/28)	NIH
5.	ET-based Irrigation Performance Assessment of a Command Area	Harsh Upadhyay Sukant Jain Richa Pandey A R Senthil Kumar P R Patil	2 years (05/25 – 04/27)	NIH

In the end, the Member-Secretary thanked all the members for their valuable contributions during deliberations in the Working Group meeting. The meeting ended with vote of thanks to the Chair.

List of Working Group members who attended the 55th 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 (Online)	Member
5.	Dr. (Mrs.) Sadhana Malhotra, Mindspace, Dehradun	Member
6.	Dr. S.S. Grewal, (Retd.), Chandigarh	Member
7.	Dr. Ramakar Jha, Professor, NIT Patna	Member
8.	Dr. R. K. Singh, ICAR-IISWC, Dehradun	Member
9.	Dr. A.K. Lohani, Sc. G & Head, SWH Division, NIH	Member
10.	Dr. Y.R.S. Rao, Sc. G & Head, EH Division, NIH	Member
11.	Dr. Suhas Khobragade, Sc. G & Head, HI Division, NIH	Member
12.	Dr. A. R. Senthil Kumar, Sc. G & Head, WRS Division, NIH	Member
13.	Dr. Anupma Sharma, Sc. G & Head, GH Division, NIH	Member
14.	Dr. Surjeet Singh, Sc. G & Head, C4S, NIH	Member
15.	Dr. Sanjay Kumar, Sc. F & Head, Technical Cell, NIH	Member-Secretary
16.	Prof. A. A. Kazmi, IIT-Roorkee	Invitee-Member

Scientists of NIH:

	C4S Division		HI Division
1.	Dr. Soban Singh Rawat, Sc. F	28.	Dr. M S Rao, Sc. G
2.	Dr.(Smt) Ashwini A. Ranade, Sc. D	29.	Dr. Gopal Krishan, Sc. E
3.	Dr. Sunil Gurrapu, Sc. D	30.	Dr. Santosh M. Pingale, Sc. D
4.	Dr. Vishal Singh, Sc. D	31.	Dr. Tripti Muguli, Sc. D
5.	Dr. Lavkush Kumar Patel, Sc. D	32.	Sri. Rajeev Gupta, Sc. B
6.	Dr. Kapil Kesarwani, Sc. D	33.	Sri. Ruchir Patidar, Sc. B
7.	Dr. Deepak Singh Bisht, Sc. C	34.	Sri V K Agarwal, Sc. B
8.	Dr. Akshaya Verma, Sc. C	35.	Dr. Amit Pandey, Sc. B
9.	Dr. Kuldeep Sharma, Sc. C		SWH Division
10.	Sri. Rajat Kumar, Sc. B	36.	Dr. P C Nayak, Sc. F
11.	Sri. Jatin Malhotra, Sc. B	37.	Dr. Ravindra Vitthal Kale, Sc. E
	EH Division	38.	Dr. R.V. Kale, Sc. E
12.	Dr. M K Sharma, Sc. F	39.	Dr. L.N. Thakural, Sc. E
13.	Dr. Rajesh Singh, Sc. E	40.	Er. J.P. Patra, Sc. E
14.	Dr. Pradeep Kumar, Sc. E	41.	Er. Sukant Jain, Sc. C
15.	Dr. Vinay Kumar Tyagi, Sc. D	42.	Dr. Soumyaranjan Sahoo, Sc. B
16.	Dr. Prasanta Kumar Sahoo, Sc. D		WRS Division
17.	Dr. Kalzang Chhoden, Sc. C	43.	Dr. Archana Sarkar, Sc. F
18.	Dr. Shakti Suryavanshi, Sc. C	44.	Dr. Manish K. Nema, Sc. E
19.	Dr. Shailendra Kumar Kumre, Sc. B	45.	Dr. P K Mishra, Sc. D
20.	Ms. Poonam, Sc. B	46.	Dr. Pravin Rangrao Patil, Sc. C
	GH Division	47.	Dr. Umesh Kumar Singh, Sc. C
21.	Dr. Sumant Kumar, Sc. E	48.	Dr. Ajay Ahirwar, Sc. C
22.	Dr. Lagudu Surinaidu, Sc. D	49.	Dr. Richa Pandey, Sc. B

23.	Dr. Nitesh Patidar, Sc. C	50.	Sri. Harsh Upadhyay, Sc. B
24.	Dr. Ajit Kumar Behera, Sc. C		Technical Cell
25.	Dr. Sushindra K. Gupta, Sc. C	51.	Sri. Rajesh Agarwal, Sc. B
26.	Dr. Satendra Kumar, Sc. B		
27.	Sri. Pintu Kumar Gupta, Sc. B		

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

REGIONAL CO-ORDINATION COMMITTEE MINUTES

HARD ROCK REGIONAL CENTRE BELAGAVI

35.1 Progress of Studies Under Work Program for the Year 2024-25

The progress of each study for the year 2024-25 was presented by the PIs/ Co-PI of the study. The comments/actions suggested by the RCC for various studies are presented in Table below.

Comments and suggestions by the RCC members on work program of 2024-25

S. No.	Project Title/Study Team	Duration	Status & Comments/ Suggestions
1.	Comprehensive Assessment of Hydrology of River basins of Western Ghats of Karnataka Team: Venkatesh, B. (PI) Abhilash, R. Jyoti P. Patil N. Varadarajan	3 year (4/23-3/26)	• Dr. Jayakumar and Dr. Sen Gupta suggested to do hydrological interpretation of the trend analysis results presented for rainfall and discharge. • Sen's slope values may be placed on maps of the results. • Further, it was suggested by them to superimpose LULC maps to analyze the changes in the trends. • The objectives of the study were suggested to rephrase by replacing the word 'usable' with 'available'.
2.	Studies on Occurrence, Distribution of Springs in parts of Western Ghats, India in collaboration with Directorate of Agriculture, Goa and NRSC, Hyderabad Team: Abhilash, R. (PI), Venkatesh, B. Jyoti P. Patil Members from Directorate of Agriculture, Goa and NRSC, Hyderabad	3 year (4/23-3/26)	• The Chairman and other members of RCC advised to prepare the springs database and share it with Centre for Springs Studies (NIH, Roorkee) for uploading in the ISHVAR portal. • Produce interim status report of springs in Goa and Karnataka, once completed with corrections from various sources. • The progress of a new collaborative study, initiated with NRSC during post-monsoon 2024, was also presented. • PI with NRSC team proposed inclusion of Sindhudurg and Kolhapur Districts of Maharashtra in the NIH-NRSC collaborative study on Springshed studies.
3.	Water productivity assessment in irrigation projects by geo-spatial optimization techniques Team: Abhilash, R. (PI) Venkatesh, B. Jyoti P. Patil	3 year (4/23-3/26)	• The Chairman and Dr. Jaya Kumar recommended to elaborate on the optimization component in the study while framing the methodology and report. • RCC suggested to initiate a new internal study on ET based tools for the NLBC command.

			• RCC recommended to collaborate with WALMI, Dharwad for ET based tool study for getting field inputs.
4.	CGWB NAQUIM 2.0 study to assess saline water ingress in Tiswadi and Bardez Taluks of North Goa Team: Abhilash, R. (PI), Venkatesh, B. Tripti, M. Jyoti P. Patil Sushmita Wadde	1 year (05/24-04/25)	• The samples are being analyzed at NIH Roorkee. • Once the isotope results are obtained from the Isotope laboratory, the outcomes and report is suggested to be prepared at earliest and submitted.
5.	Comprehensive Assessment of groundwater resources in Shallow Coastal Aquifers of Gurupur and Pavanje basins of Dakshin Kannada, Karnataka Team: Sushmita Wadde (PI), Jyoti P. Patil Abhilash, R. B. Venkatesh	2 years (6/24-3/26)	• The PI presented the study. It was informed that the two objectives of the study have been achieved and remaining two objectives will be completed in this year • The Chairman, the Coordinator, Dr. Jayakumar and Dr. Purandara suggested to correlate rainfall with water level data for better understanding of the GW variations and trend.

Recommended Work Program of HRRC, Belagavi for the Year 2025-26

S. No.	Title of Study	Team	Duration	Remarks
Internal Studies				
1.	Comprehensive Assessment of Hydrology of Rivers basins of Western Ghats of Karnataka	Venkatesh, B. (PI) Abhilash, R., Jyoti P. Patil N. Varadarajan	3 year (4/23-3/26)	Ongoing
2.	Studies on Occurrence, Distribution of Springs in parts of Western Ghats, India	Abhilash, R. (PI) Venkatesh, B., Jyoti P. Patil	3 year (4/23-3/26)	Ongoing
3.	Water Productivity assessment in Irrigation Projects by Geo-Spatial Optimization Techniques	Abhilash, R. (PI) Venkatesh, B., Jyoti P. Patil	3 year (4/23-3/26)	Ongoing
4.	Comprehensive Assessment of groundwater resources in Shallow Coastal Aquifers of Gurupur and Pavanje basins of Dakshin Kannada, Karnataka	Sushmita Wadde (PI) Abhilash, R. B. Venkatesh	2 years (6/24-5/26)	Ongoing
New Studies				
1.	Drought and desertification under changing climate in Godavari basin of Maharashtra	Jyoti P. Patil (PI) Venkatesh, B. Abhilash, R. Sushmita Wadde Amit Sharma	2 years (4/25-3/27)	• Dr. Jayakumar and Dr. Sen Gupta suggested to include an objective on suggesting mitigation measures to drought. • The Chairman, RCC suggested to coordinate with RC-Bhopal to avoid duplication of work in Vidarbha region
2.	Accuracy Evaluation of Multiple Runoff Products in Malaprabha and Netravathi river basins, Karnataka	Jyoti P. Patil (PI) Venkatesh, B. Y. R. S. Rao Sushmita Wadde Abhilash, R. Amit Sharma	2 years (4/25-3/27)	No comments
3.	Integrated operation analysis of reservoirs in Cauvery basin of	Venkatesh, B. (PI) M. K. Goel	1 years	As suggested by the Chairman

S. No.	Title of Study	Team	Duration	Remarks
	Karnataka	A. R. Senthil Kumar Jyoti P. Patil	(4/25-3/26)	
4.	Remote Sensing and ET-Based Evaluation of Water Productivity in Irrigated Agriculture.	Abhilash, R. (PI) Y. R. S. Rao Venkatesh, B., Jyoti P. Patil	2 years (4/25-3/27)	In line with EDIPA and EQIPA tools
5.	Evaluating the Impact of Toilets on GW & SW in Diverse Hydrogeological & Climatic Conditions	S. Wadde (PI), Y. R. S. Rao Abhilash, R. Jyoti P. Patil	2 years (4/25-3/27)	As per directions of MoJS, GoI

**WESTERN HIMALAYAN
REGIONAL CENTRE
JAMMU**

Progress of Work Program of WHRC, Jammu for the year 2024-25

S. No.	Title of Study	Recommendations/ Suggestions
Internal Studies (Ongoing)		
1.	Estimation of changes in snow cover and climate-cryosphere interaction in Upper Chenab River Basin	The Chairman directed PGJ to submit the final report by 15th April 2025, send the report to MM for review and associate RAM to address the comments received from reviewers.
2.	Mass balance of Phuche and Khardung glaciers, Ladakh Range with implications for downstream water availability under changing climate.	- MM appreciated the work and advised to publish the Mass Balance series as soon as possible. - The Chairman directed PGJ to complete the report with mass balance of 2019 and 2023 and submit the final report in April 2025.
3.	Understanding cryospheric processes in response to climate change and atmospheric pollutants: A case study of Jhelum basin, Kashmir Himalaya, India	- MM noted the difference in size between the two glaciers (5 km² and 1.5 km²) and observed mass loss even in the accumulation zone, indicating poor glacier health. He opined that these are temperature-sustained glaciers based on temperature and mass balance trends to which PI concurred. - MM also found it intriguing that the velocity is increasing despite ongoing mass loss. Regarding the high variability in glacier velocity, the PI suggested that this may be attributed to contributions from surrounding avalanche zones, which can temporarily increase velocity despite ongoing mass loss. This apparent contradiction between increasing velocity and mass loss is being closely examined, and the ongoing analysis aims to provide a clearer understanding of these dynamics. - The Chairman enquired whether the glacier recession assessment has been conducted. The PI responded that the glacier recession assessment has been conducted, and the results have been presented. - SD asked if the glacier has fragmented. He also enquired whether both glaciers are located within the Jhelum Basin. PI clarified that the glaciers have not yet fragmented and remain intact. The

S. No.	Title of Study	Recommendations/ Suggestions
		PI also confirmed that both glaciers are located within the Jhelum Basin, with one situated in the Lidder catchment and the other in the Sind catchment. ● The Co-Chairman suggested extending the mass balance study to the most recent year, such as 2024/25. The PI mentioned that a suitable DEM was not available to extend the analysis to recent years. However, efforts are underway to procure the necessary data to extend the study.
4.	Basin scale inventorying of rock glaciers for hydrological storage estimation and hazard vulnerability assessment in the Jhelum basin.	● SD enquired whether permafrost could be used as an alternative term for rock glaciers, noting that rock glaciers can sometimes indicate the presence of permafrost. He also pointed out that a higher number of rock glaciers are found on the Pir Panjal side of the Jhelum Basin and reported that the lakes surrounding these rock glaciers are not vulnerable. The PI responded that while permafrost and rock glaciers are related, they are not interchangeable terms. Rock glaciers can serve as diagnostic manifestations of permafrost presence, but they represent distinct geomorphological features. The PI agreed with SD's observation that a greater number of rock glaciers are found on the Pir Panjal side of the Jhelum Basin and confirmed that a few of the lakes in the area are not vulnerable. ● The Chairman queried whether the study covers the entire Himalaya or focuses on a specific basin, suggesting that "Jhelum Basin" be included in the title. He also enquired whether the reported increase in the number of rock glaciers could be due to fragmentation and whether Google Earth could be effectively used for identifying rock glaciers, recommending field validation. The PI clarified that the study specifically focuses on the Jhelum Basin, and "Jhelum Basin" will be specified in the study title. The PI further explained that the reported increase in the number of rock glaciers was not

S. No.	Title of Study	Recommendations/ Suggestions
		due to fragmentation but rather due to the improved identification and inclusion of previously missed rock glaciers. He also confirmed that Google Earth, with its high resolution, was a valuable tool for identifying rock glaciers. However, field verification will be carried out as suggested to ensure accuracy and validation. ● The Co-Chairman enquired whether HighThim can be used to estimate the thickness of rock glaciers. The PI clarified that HighThim cannot be used for this purpose, as the input data required for glaciers and rock glaciers differ significantly.
5.	Site Suitability Mapping for Rainwater Harvesting and Spring Rejuvenation in the Tawi Basin	● ASJ suggested increasing the weightage of geological layer. The PI clarified that since the main objective was stream rejuvenation, lower weightage was given to geology, although alternative scenario with higher weightage to geology will be also be tested. ● The Co-Chairman advised IS to add soil as a layer in the analysis to which the PI agreed. ● CV advised to use Group-based ranking approach in addition to AHP and fuzzy AHP to which the PI concurred. ● The Chairman asked the PI to share the results of the study to Soil & Water Conservation Department, J&K for appraisal. The PI concurred and informed that a brain-storming session will be conducted during the current year with the concerned line departments of J&K.
6.	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 thresholding method, data frequency, and cloud filtering approach. The PI responded that a bimodal histogram is used to distinguish between land and snow, along with the OTSU algorithm to determine optimal threshold values. He mentioned that the data frequency was monthly, and the cloud filter selected images with less

S. No.	Title of Study	Recommendations/ Suggestions
		than 10% cloud cover. Using monthly median values further ensures the generation of improved, cloud-free imagery. • The Co-Chairman queried whether this thresholding approach could be automated, to which the PI replied that he would explore possibilities for implementing automation. • ASJ suggested incorporating additional datasets beyond ERA5. The PI agreed that other rainfall datasets could indeed be incorporated into the climate application. He also mentioned that Indian satellite datasets are currently unavailable on the Google Earth Engine platform. • The Co-Chairman recommended adding a template specifically for climate data trend analysis, which the PI agreed to include.
7.	Comprehensive Mapping of Water Budget Dynamics and Reservoir Sedimentation in the Upper Krishna Basin using Google Earth Engine	• The Chairman has advised to change the title of the study to which the PI agreed and the new title of the study shall be “Comprehensive Mapping of Water level Dynamics and Reservoir Sedimentation for Some Reservoirs within the Upper Krishna Basin using Google Earth Engine”. • The Chairman advised to verify that all the 11 reservoirs taken for the study lies within the boundary of Upper Krishna Basin to which the PI agreed. • The Chairman asked to validate the reservoir levels for periods for which data was available at NIH, to which the PI agreed. • The Chairman and Co-Chairman advised to validate the erosion/deposition results by field verification to which the PI concurred.
Internal Studies (New)		
1.	Glacial and Landslide Lake Outburst Flood (G/LLOF) studies in Veshaw Catchment of Jhelum River Basin, Kashmir Himalaya	The proposal was approved by the RCC.

S. No.	Title of Study	Recommendations/ Suggestions
2.	Mass Balance Studies of Phuche and Khardung Glaciers, Ladakh Range: Impacts on Downstream Water Availability and Atmospheric Pollutant Effects in a Changing Climate	The proposal was approved by the RCC.
Sponsored/Collaborative Projects & Studies		
1.	Permafrost mapping and characterization of Western Himalayan Region	The Chairman directed the PI to submit the final report by 15 April, 2025.

Recommended Work Program of WHRC, Jammu for the Year 2025-26

S. No.	Title of Study	Team	Duration	Remarks
Internal Studies				
1.	Understanding 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 I. Sharma S. Singh	Apr 24 - Mar 27	Ongoing
2.	Basin scale inventorying of rock glaciers for hydrological storage estimation and hazard vulnerability assessment	R. A. Mir (PI) P. G. Jose S. Singh I. Sharma D. S. Bisht	Apr 24 - Mar 27	Ongoing
3.	Site Suitability Mapping for Rainwater Harvesting and Spring Rejuvenation in the Tawi Basin	I. Sharma (PI) S. Singh R. A. Mir	Apr 24 - Mar 26	Ongoing
4.	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	Apr 24 - Mar 26	Ongoing
5.	Comprehensive Mapping of Water level Dynamics and Reservoir Sedimentation for Some Reservoirs within the Upper Krishna Basin using Google Earth Engine	C. Prakash (PI) S. Jain S. Singh R.V. Kale A. K. Lohani	Apr 24 - Mar 26	Ongoing
6.	Glacial and Landslide Lake Outburst Flood (G/LLOF) studies in Veshaw Catchment of Jhelum River Basin, Kashmir Himalaya.	C. Prakash (PI) R. A. Mir I. Sharma S. Singh	Apr 25- Mar 27	New Study
7.	Mass Balance Studies of Phuche and Khardung Glaciers, Ladakh Range: Impacts on Downstream Water Availability and Atmospheric Pollutant Effects in a Changing Climate	R. A. Mir (PI) I. Sharma S. Singh C. Prakash G. Singh	Apr 25 - Mar 28	New Study
Externally funded R & D Studies				
1.	Geophysical and Geotechnical Characterization of Three Moraine Dammed Glacial Lakes in the Western Himalaya for GLOF Hazard and Risk Assessment	R. A Mir (PI) V. Singh, M. Hussain (NIT Srinagar)	May 25 - Mar 28 (tentative)	New Study (MoES), Recommended

In addition to the above-mentioned studies, a 2-year study entitled **“Evaluating the impact of toilets on groundwater and surface water quality in a pilot study area”** would be formulated and initiated after finalizing the pilot study area in consultation with concerned departments.

Further, another 2-year study entitled “**ET-based irrigation performance assessment in a pilot command area**” would be formulated and initiated after finalizing the pilot command area in the region in consultation with concerned departments.

**CENTRAL INDIA HYDROLOGY
REGIONAL CENTRE
BHOPAL**

Progress of Work Program CIHRC, Bhopal for the year 2024-25

The progress achieved in individual studies was presented by the respective PIs, and issues were discussed with the members in detail. The comments/observations from the members are briefly given below.

1. Development of Reservoir Operation Plan under CC scenarios for Kolar reservoir

Mrs. Shashi Poonam Indwar, Principal Investigator, presented the objectives, study area, methodology, progress, and key deliverables of the completed study. She discussed the trend analysis of annual, seasonal, and monthly precipitation, as well as maximum and minimum temperatures, using the Mann-Kendall test and Sen's Slope estimator. The crop water requirement and irrigation scheduling for Rabi crops in the Kolar Command Area were demonstrated using the CROPWAT 8.0 model, considering changes in cropping patterns. Conservation operations of the Kolar Reservoir under different scenarios (I to V) were also presented using NIH_ReSyP software. The Chairman advised the PI to submit the final report by the end of April, 2025.

2. Reassessment of evapotranspiration (ET_o) estimation for irrigation planning in MP

Dr. Ravi Galkate, Principal Investigator, presented the progress of the ongoing study which focused on evaluating the accuracy of E_o. On these suggestions, the Chairman advised the Scientists of WHRC to work in close collaboration with the Departments and finalize some proposals of suggested studies/projects for possible funding. To and Irrigation Requirement (IR) estimation methods used in Madhya Pradesh. He noted that the current Modified-Penman method, which is used in Technical Circular 25 (TC-25), overestimates the ET_o. The study utilized long-term climatic data from 52 districts and 11 agroclimatic zones, sourced from IMD stations, gridded data, and NASA POWER. Tools like CROPWAT, ET-Calculator, and an Excel-based dashboard were used for ET_o estimation. The dashboard includes four methods: Penman-Monteith, Hargreaves, Blaney-Criddle, and Modified Penman. Results showed that the Modified Penman method overestimates ET_o and recommended that the TC-25 should adopt the Penman-Monteith method. The Hargreaves method is closely aligned with the Penman-Monteith method. The TC-15 table (2002 revision) was recommended for irrigation planning. No significant changes were found in soil or cropping patterns affecting IR. The study is complete, and the report is under preparation, to be submitted by April, 2025. The recommendations of the study have been submitted to CE, BODHI for possible implementation. CE, CGWRD, Raipur, asked to share the same recommendations with the Chhattisgarh also for necessary action.

3. Water Availability Assessment for Project Formulation in Sub-Basins of Ganga River in MP

Dr. R. K. Jaiswal, Principal Investigator, informed that various models like, CS-CN, NAPI, GR2M, NAM, and linear and machine learning-based regressions were initially tested, with GR2M and regression models were found to be most suitable. The GR2M model was applied monthly at 32 gauging sites across the Betwa, Chambal, Ken, Sindh, Son, and Tons basins, yielding good

efficiencies. The Inverse Distance Weighting (IDW) method was used to obtain the spatial distribution of parameters. Relationships between catchment characteristics and GR2M parameters were established. Linear and machine learning regressions were developed basin-wise for the Ganga basin in Madhya Pradesh. The Chairman advised sharing the study outcomes with the State Water Resources Department. Dr. Jaiswal confirmed that the study has been completed and the report submitted. A copy of the report has already been shared with WRD Bhopal for review.

4. Integrated Reservoir Operation for Mahanadi Reservoir Project Complex, Chhattisgarh

Dr. R. K. Jaiswal, PI, presented the progress of a special NHP study conducted jointly by CIHRC, Bhopal and WRD, Chhattisgarh. Reservoir sedimentation for Ravi Shankar Sagar, Sondur, Dudhawa, and Muramsilli was estimated using a GEE-based program with the OTSU technique and compared with hydrographic survey results. Land use projections in the catchments were carried out using the Monte Carlo-Cellular Automata method. Reservoir data such as levels, outflows, and transfers were used to compute catchment inflows. NIH_ReSyP software was utilized to develop and refine rule curves for integrated reservoir operations. The Chairman recommended developing a QGIS/ArcGIS-based application using the OTSU technique for sedimentation analysis. Dr. Jaiswal informed that the study has been completed and the report submitted.

5. Assessment of Impact of Climate Change on Water Resources in Shipra River Basin

Dr. Ravi Galkate, PI, presented the study awarded to NIH by INCCC (MoJS) in collaboration with Rabindranath Tagore University, Bhopal. The three-year study, starting in March 2025, focuses on assessing surface and groundwater availability in the Shipra River basin. It includes water quality monitoring, assessment, and modelling for both surface water and aquifers. The study also evaluates the impact of state initiatives under Namami Gange and Swachh Bharat Mission on river water quality. Additional components involve trend analysis, change point detection, and assessing the impact of climate change on hydrology using downscaled GCM data. The required data collection is in progress, and trend analysis is carried out for rainfall. MIKE-11 NAM has been applied for the Ujjain G/d site for water availability assessment. The Chairman advised removing the objective related to developing criteria for urban stormwater drainage, noting that conducting such a study at a single location would not adequately represent regional issues. Additionally, this component requires high-resolution data from multiple locations, which is often difficult to obtain. As such, it may also divert focus from the study's core objectives. All members agreed to exclude this component to maintain clarity and focus on the primary goals of the study.

6. Water Resource Management for Tawa River Basin under Climate Change

Dr. R. K. Jaiswal, PI, presented the study submitted to INCCC (MoJS) in collaboration with Madhyanchal Professional University, Bhopal. The study has been approved in principle, and while the letter of award is awaited, it is currently being carried out as an in-house project. The objectives include trend and change point analysis for detecting climate change signals, and developing a framework for impact assessment and strategic management of the Tawa River Basin. A water balance model for the Tawa reservoir has been developed, incorporating all inflow and outflow

components. A conceptual hydrological model (NAM) is planned to be applied to the Tawa catchment. The study also aims to identify suitable CMIP6 models, conduct demand-supply analysis, and assess sediment distribution and reservoir capacity. A multi-criteria decision support (MCDS) framework has been designed for evaluating management plans under climate change. Trend analysis was performed using Mann-Kendall and Spearman's rho tests. Data collection is complete, and the study is currently in progress.

Item No. 23.6: To consider the work program for the year 2025-26

The studies of 2024-25 that will continue along with the new studies proposed for the year 2025-26 were discussed. After deliberations, the RCC recommended and approved the following six studies (given in Table 23.1) under the work program of CIHRC, Bhopal, for the year 2025-26. The remarks, observations, and suggestions of RCC members regarding the **four newly proposed studies** are given below.

1. Assessment of Risk Due to Dam/Lake-Related Disaster and Preparation of Action Plan in Urban Sprawls of Central India Region

The Chairman advised removing the word "lake" from the study title and revising it accordingly. RCC members were requested to inquire whether similar studies have already been conducted on these dams by other departments. Additionally, the Chairman recommended excluding breach-related calibration from the modeling component. It was further advised to involve the NDMI of SDMI in the study for enhanced coordination and technical input.

2. Drought risk assessment and mitigation under climate change scenarios in Vidarbha region

The Chairman advised to review the study proposed by HRRC, NIH, Belagavi to ensure that there is no overlap in study areas and to plan subsequent activities accordingly.

3. Assessment of Groundwater Flow Dynamics using MODFLOW in Shallow Aquifer System of Tawa basin and Tawa Command in M.P

The Chairman recommended merging the second and third objectives, as they were found to be overlapping. Additionally, the Chairman suggested involving CGWB in the study. Dr. Y.R.S. Rao, Scientist-G & Head, Environment Hydrology Division, NIH, advised removing the word "MODFLOW" from the study title.

4. Flood Assessment and Management under Climate Change Conditions in Wainganga River Basin

The Chairman and the Coordinator, CIHRC, Bhopal advised that the initial stage of the project should focus on identifying critical or flood-vulnerable stretches and determining the causes of flooding at those locations. The study title should be revised to reflect this focus. In this phase, relevant field data is to be collected from CWC and State WRDs, and a status report may be submitted within the first year. The objectives and the modeling components can thereafter be devised based on the status report inputs which can be taken up in the subsequent stage.

Recommended Work Program of CIHRC, Bhopal for the Year 2025-26

S. No.	Title of Project/Study	Study Team	Duration	Status & Funding
Internal Studies				
1.	Assessment of Risk Due to Dam Related Disaster and Preparation of Action Plan in Urban Sprawls of Central India Region	Dr. R.K. Jaiswal Dr. R.V. Galkate Er. Shashi Indwar Er. Suryansh Mandloi Er. Rahul Kumar WRD, MP, CG, MH	2 years (April, 2025 to March, 2027)	New Study In-House
2.	Drought risk assessment and mitigation under climate change scenarios in Vidarbha region	Dr. R.V. Galkate Dr. R.K. Jaiswal Er. Shashi Indwar Er. Suryansh Mandloi Er. Rahul Kumar WRD, Maharashtra	2 years (April, 2025 to March, 2027)	New Study In-House
3.	Assessment of Groundwater Flow Dynamics in the Shallow Aquifer System of Tawa basin and its Command	Er. Shashi Indwar Dr. R.K. Jaiswal Dr. R.V. Galkate, Er. Suryansh Mandloi Er. Rahul Kumar WRD, MP	2 years (April, 2025 to March, 2027)	New Study In-House
4.	Assessment and status of floods in the Wainganga River Basin	Er. Suryansh Mandloi Dr. R.K. Jaiswal Dr. R.V. Galkate Er. Shashi Indwar Er. Rahul Kumar WRD, MP	2 years (April, 2025 to March, 2027)	New Study In-House
Sponsored studies				
5.	Assessment of impact of climate change on water resources in the Shipra River basin	Dr. Ravi Galkate Dr. R. K. Jaiswal Er. Shashi Indwar Er. Suryansh Mandloi Er. Rahul Kumar RNTU, Bhopal	3 years (April, 2025 to March, 2028)	Ongoing NIH/INCCC
6.	Water Resource Management for Tawa River basin under Climate Change	Dr. R. K. Jaiswal Dr. Ravi Galkate Er. Shashi Indwar Er. Suryansh Mandloi Er. Rahul Kumar MPU Bhopal	3 years Started as an internal study from May 2024 Will continue as an in-house study	Ongoing NIH/INCCC

			till it is awarded.	
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In addition to the above-mentioned studies, a 2-year study entitled “**Evaluating the impact of toilets on groundwater and surface water quality in a pilot study area**” would be formulated and initiated after finalizing the pilot study area in consultation with concerned departments.

Further, another 2-year study entitled “**ET-based irrigation performance assessment in a pilot command area**” would be formulated and initiated after finalizing the pilot command area in the region in consultation with concerned departments.

**DELTAIC REGIONAL CENTRE
KAKINADA**

Progress of Work Program of DRC, Kakinada for the Period 2024-25

The final results of the completed study, the progress of the ongoing study for the year 2024-25, and the proposed activity for continuing study in the next year (2025-26) were presented by the respective principal investigator. The comments/improvements suggested by the RCC members on each study are given below.

S. No.	Project	Study Team	Status & Comments
I. Internal Project (completed/ongoing)			
1	Impact assessment of backwater through drains, creeks and river mouths on groundwater salinity in the Godavari Delta, Andhra Pradesh	Y.R. Satyaji Rao (PI) Y. Siva Prasad V.S. Jeyakanthan R. Venkata Ramana	1. Sri Srinivas asked that the sources of high mercury in creeks/drains are to be identified. 2. Prof. Elango asked to study the reasons for the presence of high mercury and absence in groundwater with respect to the subsurface conditions. Mercury levels need to be collected at high saline creeks and shallow wells locations. 3. Dr. Siva Kumar suggested that groundwater level and quality contour maps are to be studied over the hydrogeology map. Groundwater flow paths will be useful for understanding high mercury in surface water. The Chairman asked the PI to submit report by March 2025.
2	Storm water flood management in the coastal city - A case study	R. Venkata Ramana (PI) Y.R. Satyaji Rao V.S. Jeyakanthan	Dr. Y.R. Satyaji Rao requested Dr. A. Hakeem, NRSC to provide the processed SAR data of 17 th October 2024 for KMC for better comparison of the storm drainage node flooding for incorporating in the report. The Chairman suggested to consider the storm surge impact on inundation. The Chairman asked the PI to submit report by March 2025.
3	A study on Source sustainability – A case study of JJM in Odisha	S. V. Vijaya Kumar (PI) V.S Jeyakanthan Y. Siva Prasad P.C. Nayak	The Chairman directed to complete the study as per schedule and submit the report by March 2025.

4	Climate Change Impact Assessment under Future Scenarios over the East Coast of India: A focus on the Hydroclimatic Extremes	Y.R. Satyaji Rao (PI) Sabyasachi Swain V.S. Jeyakanthan R. Venkata Ramana	No Comments were made. The report will be submitted by March 2025.
5	Evaluation and post-processing of multi-model short-to medium-range precipitation forecasts: Towards developing a flood early warning system over Subarnarekha Basin	Y.R. Satyaji Rao (PI) Sabyasachi Swain Biswajeet Pradhan Saswata Nandi	No Comments RCC recommended the continuation of the study with PI from DRC, Kakinada
6	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	The Chairman and Dr. Sivakumar, CGWB suggested to compare the ET results from WA+ with other estimates using satellite data. RCC recommended the continuation of the study.
7	Seawater Intrusion Modelling in the Pennar Delta, Andhra Pradesh	Y. Siva Prasad (PI) Y.R. Satyaji Rao, V.S. Jeyakanthan R. Venkata Ramana S.V. Vijaya Kumar	1. Dr. Y.R.S. Rao suggested to incorporate CORS data of Survey of India for better accuracy of elevation data. The same data should be considered for groundwater levels (amsl). 2. Prof Elango suggested to analyse impact of temperature. 3. Dr. Siva Kumar suggested to analyse bromide to assess seawater intrusion. He suggested to study dissolution and dilution effects. More deep well data of Pennar delta should be collected from CGWB. RCC recommended the continuation of the study.

Recommended Work Program of DRC, Kakinada for the Year 2025-26

S. No.	Project	Study Team	Duration (Start-End mm/yy)	Funding
1	Dam-break analysis and emergency Action plan - A case Study of Mylavaram Dam in Andhra Pradesh (2025-26)	R. Venkata Ramana (PI) Y.R.Satyaji Rao S.K. Kumre V.S. Jeyakanthan Y. Siva Prasad	1 year (04/25-03/26)	Internal Funding (NIH)
2	Study on Evaluation of ET in Command area	Y. Siva Prasad (PI) V.S. Jeyakanthan R. Venkata Ramana	1 year (04/25-03/26)	Internal Funding (NIH)
3	Study on the impact of toilets on surface water and groundwater quality	R. Venkata Ramana (PI) Y. R. Satyaji Rao Y. Siva Prasad V.S. Jeyakanthan	2 years (04/25-03/27)	Internal Funding (NIH)
4	Identification of geogenic/anthropogenic contaminant pathways in to the cancer hotspot regions in the East Godavari District of Andhra Pradesh	Y. Siva Prasad (PI) R. Venkataramana V. S. Jeyakanthan S. V. Vijaya Kumar Scientists from NIH, Roorkee	1 year (04/25-03/26)	Internal Funding (NIH)

Initially, a new study entitled “Study on the efficacy of water harvesting and recharge structures in Tamil Nadu (to be finalised in consultation with RD, CGWB, Chennai)” was planned at S. No. 4. However, because of the emergent occurrence of cancer cases in East Godavari district of Andhra Pradesh, it is finalized to study the geogenic and anthropogenic contaminants in the affected regions on priority in this year. In the meantime, water harvesting and recharge structures in Tamil Nadu can be finalised in consultation with RD, CGWB, Chennai for determining their efficacy in the next year.

**NORTH EASTERN REGIONAL
CENTRE, GUWAHATI**

Progress of Work Program of NERC, Guwahati for the year 2024-25

1. Linear hydrological routing using satellite precipitation datasets for flood forecasting in parts of Brahmaputra Basin

Sh. Siddharth Arora presented the study. It was suggested to use ERAQ5, IMD & IMERGE datasets for hydrological modelling to be used for subsequent flood modelling in Buri Dehing and Kameng river basins. The Chairman directed to complete the study within the stipulated time and expedite the remaining work. The project report shall be shared with concerned authorities from State Government.

2. Hydrodynamic modeling for riverbank protection - A case study

Dr. Swapnali Barman, Scientist 'D' and PI of the study, presented the study's progress. The committee recommended incorporating preventive measures against erosion for the study area. The PI confirmed that this is one of the study's objectives and that appropriate preventive measures will be proposed accordingly.

3. Isotope characterization of waters and hydrograph separation in Dibang river catchment in Arunachal Pradesh

Sh. Siddharth Arora presented the progress of the study. The member-secretary suggested to modify the objectives in line with expected scientific outcomes. A field visit was proposed to be undertaken to which the Chairman accorded approval. The field visit shall be undertaken in Month of May 2025. The Member-Secretary proposed to install ORGs in the region to collect rainfall samples and take on-board State WRD & PHED for sampling of springs.

4. Rainfall-induced flood hazard risk vulnerability assessment in Jaintia Hills, Meghalaya

Dr. W. R. Singh presented the study. It was suggested to link the results with landslide maps and validate the results with satellite images to understand the extent of vulnerable areas. It was also suggested to incorporate future rainfall data for determining the vulnerability of flood. The Chairman suggested to complete the study by March 2025 and submit the report. Subsequently, the PI may take another six months to incorporate the revisions and suggestions of the members.

5. Flood inundation modelling of Dikhow River Basin of Assam

Dr. S. K. Sharma presented the study. Dr. Pankaj Mani, Scientist 'G' commented that runoff should be expressed as volume on monthly basis. Shri. G. L. Bansal, Chief Engineer, BBO, CWC, Guwahati suggested validating the simulation inundation extent with satellite datasets. The Chairman asked to complete the study by March 2025.

Recommended Work Program of NERC, Guwahati for the year 2025-26

S. No.	Title	Study Group	Duration (Month/Year)	Remarks
1.	Hydrodynamic modeling for riverbank protection- A case study	S. Barman, W. R. Singh, S. K. Sharma, S. V. Vijayakumar	1.5 yrs (09/23 to 03/25)	Internal ongoing
2.	Linear Hydrological routing using Satellite precipitation datasets for flood estimation in parts of Brahmaputra Basin	S Arora, W. R. Singh, S. Barman, S. K. Sharma,	1.5 years (03/24 – 09/25)	Internal ongoing
3.	Isotope characterization of waters and Hydrograph Separation in Dibang river catchment in Arunachal Pradesh	S. Arora, W. R. Singh, Amit Pandey	3 Years (07/24 – 12/26)	Internal ongoing
4	Integrated geo-environmental appraisal of Barpeta town, Hauli town, Barpeta Road, and its adjoining area to assess the causes and remedies of the urban flood.	S. Barman, W. R. Singh, S. Arora, S. K. Sharma	2 years (04/25 – 03/27)	New collaborative study
5.	An Analysis of the Hydrogeomorphic and Social Aspects of Dam in the Lower reaches of Ranganadi HPP, with Special Emphasis on Climate Change	NERIWALM, W. R. Singh, S. Barman	2 years (12/24 – 11/26)	New sponsored collaborative study
6.	Short Term Flood Forecasting Using Bootstrap based Artificial Neural Networks within Dikhow River Basin	S. K. Sharma, S. Barman, W. R. Singh, S. Arora	1 year (2/25 to 3/26)	New internal study

In addition to the above-mentioned studies, a 2-year study entitled **“Evaluating the impact of toilets on groundwater and surface water quality in a pilot study area”** would be formulated and initiated after finalizing the pilot study area in consultation with concerned departments.

Further, another 2-year study entitled **“ET-based irrigation performance assessment in a pilot command area”** would be formulated and initiated after finalizing the pilot command area in the region in consultation with concerned departments.

**CENTRE FOR FLOOD
MANAGEMENT STUDIES, PATNA**

Approved Work Program of CFMS, Patna for the year 2024-25

S. No.	Title	Study Team	Duration
Internal Study			
1.	Influence of non-stationarity on flood frequency analysis for South-Bihar region	Dr. Pravin Rangrao Patil (PI), Dr. Pankaj Mani, Shri Suryansh Mandloi	02 years (04/23- 03/25)
2.	Evaluation of hydrologic models for Gandak river basin	Shri Suryansh Mandloi (PI), Dr. Pankaj Mani, Shri Shubham Shaurabh, Dr. Pravin Rangrao Patil, Dr Vishal Singh, Ex Engr. CWC, LGBD, Patna.	02 years (04/23- 03/25)
3.	Morphological study of Kichha river for selection of new site for Kichha barrage in Udham Singh Nagar, Uttarakhand	Dr. Pankaj Mani (PI), Shri JP Patra Shri Shubham Shaurabh, Shri Anil Kumar, Shri Atm Praksh	01 year (04/24- 03/25)
4.	Urban Flood Modelling for selected region of Phulwarishrif, Patna, Bihar	Shri Shubham Shaurabh (PI), Dr. Pankaj Mani, Shri Anil Kumar, Shri Atm Praksh	03 years (04/24- 03/27)
5.	Sediment Yield modelling of the Gandak River basin using SWAT Model	Dr. Rajesh Ranjan (PI), Dr. Pankaj Mani	03 years (04/24- 03/27)
6.	Application of macroscale hydrologic model to estimate design flood in Gandak river basin	Shri Minotshing Maza (PI), Dr. Pankaj Mani, Dr. Waikhom Rahul Singh, Shri Suryansh Mandloi, Dr. Ankur Srivastava (PDF, Univ of Technology, Sydney)	03 years (04/24- 03/27)
Sponsored Study (PDS/NHP)			
7.	Modelling and management of erosion and sedimentation processes in a reach of Gandak River using morpho-dynamic modelling	Dr. Pankaj Mani (PI) Shri J. P. Patra Shri B. Chakravorty & WRD Bihar	03 years (05/21- 09/24)

Gist of Discussions on Study Presentations for the year 2024-25

S. No.	Title of Study	Status and Recommendations/Suggestions
Internal Studies		
1.	Influence of non-stationarity on flood frequency analysis for South-Bihar region	The progress of the study was presented by Dr. Pravin Rangrao Patil. The objectives of the study were achieved. But few analyses part is remaining and for that, an extension of 3 months was requested up to June 2025. Suggestions: Dr. Ramakar Jha, Prof. NIT Patna suggested to explore the utility of EasyFit software to plot multiple data. He also advised to show the interdependencies of peak rainfall with peak discharge. The extension of completion time was granted by the Chairman. He instructed to share the completed study report to the Technical Cell of NIH Roorkee.
2.	Evaluation of hydrologic models for Gandak River basin	The progress of the study was presented by Shri Suryansh Mandloi and informed that the Validation of GRACE dataset was pending. He requested to drop MIKE 11 NAM model due to licence issue. He reported that the study was under progress and report would be submitted by March 2025. Suggestions: • Dr. Ramakar Jha, Prof. NIT Patna, suggested to verify the input data as a diversion structure is located upstream of the basin. • Head, CFMS, Patna suggested to use the time series of canal diversion data from the FMISC Site for the simulation period. • Chairman also recommended to use flow diversion data for improve calibration and validations.
3.	Morphological study of Kichha river for selection of new site for Kichha barrage in Udham Singh Nagar, Uttarakhand	The progress of the study was presented by Shri Shubham Shaurabh. The study is completed and the reports of the study is shared with UP Irrigation Department. Suggestions: Chairman suggested to share the copy of the report to the Technical Cell, NIH, Roorkee.

4.	Urban Flood Modelling for selected region of Phulawrisharif, Patna, Bihar	The progress of the study was presented by Shri Shubham Shaurabh. He informed that the survey work was being carried out. Suggestions: • Dr. Ramakar Jha, Prof. NIT Patna, suggested to study temporal flood scenarios in study reach. • Shri Bhawesh Kumar, EO Nagar Parishad Phulwarisharif informed that during last 10-12 years, rainfall was getting concentrated within 2-3 days. He suggested that the study should include this aspect. • Dr. Y.R.S. Rao suggested to carry out the mapping for the extreme rainfall events using SAR images. • Shri Ashish Kumar, IMD Head Patna, informed that the thunderstorm is now common in the area and asked to include with analysis.
5.	Sediment Yield modelling of the Gandak River basin using SWAT Model	The progress of the study was presented by Dr. Rajesh Ranjan. He informed that the work was under progress. Suggestions: Chairman suggested to apply for obtaining hydrological data from CWC. He also advised to get other datasets required for model from the scientist working on the same basin. He also instructed to include Shri Minotshing Maza and Shri Suryansh Mandloi in the study and complete this study within next 1 year.
6.	Application of macroscale hydrologic model to estimate design flood in Gandak river basin	The progress of the study was presented by Shri Minotshing Maza. He informed that the work was under progress and would be completed within the scheduled time duration. Suggestions: • Dr. Ramakar Jha, Prof. NIT Patna, instructed to improve the calibration of the model and suggested to include scattered plot also for evaluation of model performance. • Shri Amit Shankar Sant, Prof. IIT Patna, suggested to evaluate other methods of interpolation of meteorological data apart from bi-linear interpolation technique.

Sponsored Study (PDS/NHP)		
7.	Modelling and management of erosion and sedimentation processes in a reach of Gandak river using morphodynamic modelling	The progress of the study was presented by Dr. Pankaj Mani. The study is completed and the report is submitted to NHP in October 2024. Chairman suggested to send a copy of the PDS report to the Technical Cell, NIH Roorkee.

Recommended Work Program of CFMS, Patna for the year 2025-26

S. No.	Title	Study Team	Duration
Internal Study			
1.	Urban Flood Modelling for selected region of Phulwarishrif, Patna, Bihar	Shri Shubham Shaurabh, Dr. Pankaj Mani, Shri. Minotshing Maza, Shri. Suryansh Mandloi, Shri. Anil Kumar, Shri. Atm Praksh	03 years (04/24-03/27)
2.	Application of macroscale hydrologic model to estimate design flood in Gandak river basin	Shri Minotshing Maza, Dr. Pankaj Mani, Dr. Waikhom Rahul Singh, Shri Suryansh Mandloi, Dr. Ankur Srivastava (PDF, Univ of Technology, Sydney)	03 years (04/24-03/27)
3.	Sediment Yield modelling of the Gandak River basin using SWAT Model	Dr. Rajesh Ranjan, Dr. Pankaj Mani Shri. Minotshing Maza,	03 years (04/24-03/27)
4.	Influence of non-stationarity on flood frequency analysis for South-Bihar region	Dr. Pravin Rangrao Patil, Dr. Pankaj Mani, Shri Suryansh Mandloi	02 years (04/23-06/25)

In addition to the above-mentioned studies, a 2-year study entitled “**Evaluating the impact of toilets on groundwater and surface water quality in a pilot study area**” would be formulated and initiated after finalizing the pilot study area in consultation with concerned departments.

Further, another 2-year study entitled “**ET-based irrigation performance assessment in a pilot command area**” would be formulated and initiated after finalizing the pilot command area in the region in consultation with concerned departments.

**NORTH WESTERN REGIONAL
CENTRE, JODHPUR**

Progress of Work Program of NWRC, Jodhpur for the year 2024-25

1. Assessment of Water Level Rise Crisis in Jodhpur, Rajasthan: A Comprehensive Follow-up Study with Challenges and Remedial Approaches

Dr. Sourabh Nema, Principal Investigator of the study, delivered the final presentation on the rising water levels in Jodhpur city, highlighting the associated challenges and proposing remedial recommendations. The presentation encompassed the full scope of progress made under the project from inception to conclusion. Dr. Nema outlined the aims and objectives of the study and presented a comprehensive overview of the datasets used, along with their respective source agencies for the study area covering Jodhpur city. In the results section, he shared findings on rainfall trend analysis, field survey data, and pre- and post-monsoon groundwater levels, along with their observed trends. Additionally, he presented insights from isotopic signatures, their correlations, geochemical analyses, and water quality parameters. The study's water balance analysis for Jodhpur city was also discussed, followed by the outcomes of groundwater modeling under various vertical pumping scenarios to address the rising water table in affected zones. Furthermore, the efficiency of Jodhpur's drainage system was evaluated using the SWMM model. Key findings and concluding remarks were shared with RCC members, followed by an open discussion.

During the meeting, Er. Gopal Singh Bhati emphasized the importance of identifying practical and feasible solutions. He further advised to consider the initiation of a comprehensive new study on stormwater drainage systems, with a special focus on the issue of untreated sewage entering the Jojari River and the nitrate contamination in Jodhpur due to soak pits. He suggested that this new study may be undertaken in collaboration with other important Institutes, incorporating quantifiable datasets to ensure accuracy and relevance. Sh. Rishendra Singh highlighted the fundamental issue of aged sewer lines and noted that the Public Health Engineering Department (PHED) may utilize the recommendations of vertical drainage for waterlogged region. Dr. Reet Kamal Tiwari advised that the next step may involve collaborations to ensure the safe and effective disposal of groundwater from problematic areas to nearby water-scarce regions. Sh. Rajendra Kumar Singh suggested that excess water may be utilized for commercial use like in railway, hotels, steel industries, car washing etc. and suggested to provide recommendation in this direction as well. In conclusion, the Chairman desired that the project report may be shared with RCC members for their suggestions. It was also noted that a workshop with key stakeholders may be organized in the near future for more insightful discussion and successful implementation of findings.

2. Identification of different crops at farm scale using remote sensing data in IGNP canal command area

Sh. Sudesh Singh Choudhary, Principal Investigator (PI) of the study, delivered the final presentation of the project. He began by outlining the key objectives of the study, which focused on understanding water distribution and identifying the cultivable command area. The PI showcased the field database collected for two-year Rabi season data (2023-24 to 2024-25), highlighting the crop diversity observed during each period. He then presented the methodology used for crop identification, which involved the development of a classification model using ground truth data and the application of various machine learning techniques using Google Earth Engine (GEE). The

classification accuracy of crop mapping was found to be satisfactory with 75% of accuracy. Following this, PI provided an overview of the crop-wise water demand estimation using the CROPWAT software. He presented seasonal water requirements for different crops, illustrating the variation across cropping periods. The results were validated with IGNP reported data. In conclusion, he summarized the major outcomes of the project, emphasizing their relevance in promoting sustainable water management within the Danttor distributary of IGNP command area.

Dr. Reet Kamal Tiwari encouraged to incorporate the Soil Adjusted Vegetation Index (SAVI) for increasing the model performance. Er. Mahendra Sharma suggested promoting crops that need less water and encourage water-saving practices, noting that Isabgol uses very little water and is commonly grown in the Danttor distributary area. In response, the PI shared results showing that Isabgol cultivation increased in 2024-25 compared to 2023-24 due to reduced canal water supply in 2024-25. Sh. Rajendra Kumar Singh recommended that crop water requirements may be analyzed for the same crop based on different varieties of seeds. Sh. Rishendra Singh appreciated the study efforts and suggested exploring various permutations and combinations of cropping patterns based on seasonal canal water availability. Er. Rakesh Kumar supported the results as the canal water supplied was less during 2024-25 compared to 2023-24, because of which, the farmers had shifted their crop type towards Isabgol cultivation. In conclusion, the Chairman desired that the project report may be shared with RCC members for their suggestions.

3. Hydrological Monitoring in Jojari River Basin

Dr. Sourabh Nema, Principal Investigator of the study, informed that a work order has been issued to the State Ground Water Department for the construction of 10 piezometers along the Jojari River. These will facilitate regular monitoring of shallow groundwater fluctuations and assess the influence of river water on the shallow unsaturated zone near the river. He also mentioned that the procurement process for rain gauges is currently underway for the establishment of rainfall monitoring stations in the vicinity of the river. However, challenges have been encountered in appointing a contractor for the installation of two stilling wells. Consequently, the feasibility and design of the stilling wells will be re-evaluated in the coming year. Additionally, monthly monitored water quality data, including pre- and post-monsoon assessments, were presented, along with BOD and COD results obtained from CPCB. Er. Gopal Singh Bhati suggested that last 10-year dataset of Jojari river can be collected from JDA & Nagar Nigam for further analysis. He suggested that if possible, PI can include Bandi River for industrial discharge impacts along with Jojari. He also suggested to collaborate with CPCB for further action. Dr. Reet Kamal Tiwari suggested that PI can also refer the Rajasthan SSAP reports. Towards the conclusion, the Chairman noted that, as the project focuses on hydrological monitoring, it is expected to continue for long-term to prepare a comprehensive field database in order to study the river hydrology, associated water quality, and river-aquifer interaction.

4. Analyzing the Flash Flood events in the Luni River Basin and Remedial Measures to Store Excess Water

Sh. Akshay Vyankat Dahiwal, Principal Investigator of the study presented the progress. He began by outlining the four key objectives of the study and elaborated on the data collection from

various agencies. He also mentioned multiple field visits conducted to collect grain size distribution data from the Luni basin. Under the results section, he presented the observed long-term district-wise rainfall variability in the basin and illustrated the trends and noticeable shifts in rainfall patterns under climate change scenarios. He further highlighted the top 10 extreme rainfall events experienced in each district between 1957 and 2023, emphasizing their role in flash flood occurrences. The observed discharge events from two CWC stations were also demonstrated, along with the monsoonal reservoir storage data for Jaswant Sagar Dam for the year 2024. Additionally, the phased installation of rain gauges across the basin was shown. Toward the end of the presentation, model simulations of the Jawai River using both HEC-RAS and ANUGA models were discussed. In particular, the ANUGA model's parallel simulation performance on the High Performance Computing (HPC) system was highlighted, showing a 28 times speedup compared to serial simulation. The presentation concluded with the future roadmap for the study and the conference article published as part of the ongoing research.

Dr. Saran Aadhar emphasized the importance of conducting a comprehensive hydrological analysis to reconstruct past flood events. He noted that this would be instrumental in identifying inundated and flood-affected areas, which could then serve as a foundation for planning effective remedial measures aimed at storing excess floodwater. The Chairman recommended validating these inundated areas during flood events by correlating them with discharge data, thereby improving the accuracy and reliability of the study's outcomes. Sh. Rajendra Kumar Singh highlighted the need to spatially represent short-duration, high-intensity rainfall events, citing the example of Jodhpur city, where inadequate drainage infrastructure has frequently resulted in flash flood conditions, including incidents where vehicles were seen floating in floodwaters. He suggested referencing the ISRO study on the 2006 flash flood in the Barmer and Jaisalmer districts, where approximately 500 mm of rainfall occurred within just 8 hours. Including such historical events would enhance the depth and relevance of the current study. Additionally, he pointed out the significance of soil strata and moisture conditions in flood behavior, particularly mentioning the presence of materials like bentonite, which can impact runoff generation. He referred to a study by Dr. Abhay Wayal (Head, Civil Engineering, VJTI), which documented cascading structural failures. He concluded by stressing that the PI must consider external factors such as soil conditions, existing hydraulic structures, and rainfall characteristics while modeling flash floods within the basin.

5. Assessment of Water Productivity, Land Productivity and Agricultural Drought in Luni River Basin

Shri Dilip Barman, Principal Investigator of the project presented the progress of the study. He began by providing an overview of water availability and agricultural demand at the global, national (India), state (Rajasthan), and basin (Luni) levels. The key objectives of the study were also outlined. He elaborated on the datasets used in the study, highlighting their spatial and temporal resolutions along with the respective data sources and agencies. He informed that a few field visits were conducted within the Luni Basin to assess cropping patterns and crop yields through crop cutting experiments. In the results section, the PI showcased land and water productivity for both Kharif and Rabi seasons using the WA+ (Water Accounting Plus) framework, incorporating mean productivity values as provided by the state government. Furthermore, he presented an analysis of meteorological droughts that the Luni Basin had experienced in the past, utilizing the Standardized

Precipitation Index (SPI). Towards the end of the presentation, he outlined the remaining tasks to be completed along with the corresponding project timeline.

Er. Gopal Singh Bhati enquired whether it would be possible to segregate productivity data for irrigated and non-irrigated areas, emphasizing that this distinction should be reflected in the results. The Chairman informed the members that the WA+ framework will be integrated into the ET-based irrigation performance study, which will help address such aspects of water productivity analysis.

6. Assessment of Diversified Crop Types Using Remote Sensing Data in Luni River Basin

Sh. Malkhan Singh Jatav, the Principal Investigator of the study presented the progress of the ongoing work. He began by providing an overview of the major crop types in the basin, highlighting the key challenges faced and emphasizing the significance of the study. He outlined the main aims and objectives, followed by a detailed explanation of the schematic framework that will be implemented in the study. In the results section, he showcased the changes in land use and land cover patterns observed from 2005 to 2019. To identify cropping patterns, two field surveys were conducted across various locations in the Luni Basin. He explained the distribution of cropping patterns observed during these field visits. He also shared details of the calibration of a crop classification model using the Google Earth Engine (GEE) framework. In addition, seasonal crop water demand data was collected during the field visits. Preliminary thematic layers were prepared to identify suitable Managed Aquifer Recharge (MAR) sites within the basin. Towards the end of presentation, PI summarized the preliminary findings and outlined the future course of work along with the timeline of the project.

Sh. Rishendra Singh raised a query regarding the presence of cotton crops shown in the Kharif season. The PI clarified that during field visits conducted in the Kharif season, a few patches of farmland growing cotton were indeed observed. The Chairman advised the PI to incorporate the ISRO database and adopt their established framework for monitoring crop growth using stage-wise NDVI (Normalized Difference Vegetation Index) and SVI (Spectral Vegetation Index), as elaborated by Er. Sagar S. Salunkhe. Er. Salunkhe further explained that during the Kharif season, frequent cloud cover poses significant challenges for optical satellite observations. To address this issue, he recommended the use of alternate satellite products to ensure continuous monitoring. Additionally, he emphasized the necessity of conducting field-level crop cutting experiments to accurately estimate crop yield and to validate remote sensing data. Sh. Rajendra Kumar Singh raised a query regarding the increasing trend of fallow land in the Luni basin. He recommended that this trend need to be analyzed in the broader context of agricultural dynamics, including crop rotation practices, the rising purchasing power of farmers, increased mechanization, and improved seed availability.

7. Preparation of Status Report of the Salinity Ingress in Coastal Area of Saurashtra and Kachchh, Gujarat State

Dr. Anupma Sharma, PI of the study, provided a brief overview of the externally funded R&D projects, which has been approved for funding by the Gujarat Water Resources Development Corporation Ltd. (GWRDC). Total forty-four reports are to be prepared and submitted under the sponsored project. She informed the RCC members that four project reports pertaining to four

reaches in the coastal area of Saurashtra and Kachchh are scheduled for submission to GWRDC in the month of April. Dr. Sharma further informed that, due to her superannuation, the project will now be led by Scientist(s) from Groundwater Hydrology Division, NIH, Roorkee. Accordingly, the project will be transferred from NWRC, Jodhpur to the Groundwater Hydrology Division at NIH, Roorkee.

Recommended Work Program of NWRC, Jodhpur for the Year 2025-26

S. No.	Project Title	Study Team	Duration	Funding	Status
1.	Hydrological Monitoring in Jojari River Basin	Dr. Sourabh Nema Sh. Sudesh S. Choudhary Dr. Anupma Sharma Dr. M. K. Sharma Sh. Akshay V. Dahiwalé Sh. Malkhan Singh Jatav	Continuous Monitoring (Dec-2023 to Continue)	Internal	Ongoing
2.	Analyzing the Flash Flood events in the Luni River Basin and Remedial Measures to Store Excess Water.	Sh. Akshay V. Dahiwalé Dr. Sourabh Nema Dr. Anupma Sharma Sh. Dilip Barman Sh. Malkhan Singh Jatav	1 year 9 months (Apr-2024 to Dec-2025)	Internal	Ongoing
3.	Assessment of Water Productivity, Land Productivity and Agricultural Drought in Luni River Basin	Sh. Dilip Barman Dr. Sourabh Nema Dr. Prabhask K. Mishra Dr. Anupma Sharma Sh. Malkhan Singh Jatav Sh. Akshay V. Dahiwalé	2 years (Apr-2024 to Mar-2026)	Internal	Ongoing
4.	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 (Apr-2024 to Sept-2026)	Internal	Ongoing
5.	Sustainable Water Management and Recharge Strategies for Water Security in Alwar District	Sh. Sudesh Singh Choudhary Dr. Sourabh Nema Sh. Dilip Barman Sh. Malkhan Singh Jatav Sh. Pintu Kumar Gupta	2 years (Apr-2025 to Mar-2027)	Internal	New
6.	Enhancing Dam Safety through Rapid Risk Assessment and Dam Break Analysis: A Case Study of Selected Dams in Rajasthan and Gujarat	Sh. Akshay Vyankat Dahiwalé Dr. Sourabh Nema Dr. Ajit Kumar Behera Sh. Sudesh Singh Choudhary Sh. Malkhan Singh Jatav	2 years (Apr-2025 to Mar-2027)	Internal	New

In addition to the above-mentioned studies, a 2-year study entitled “**Evaluating the impact of toilets on groundwater and surface water quality in a pilot study area**” would be formulated and initiated (led by Dr. Sourabh Nema) after finalizing the pilot study area in consultation with concerned departments.

Further, another 2-year study entitled “**ET-based irrigation performance assessment in a pilot command area**” would be formulated and initiated (led by Mr. Sudesh Singh Choudhary) after finalizing the pilot command area in the region in consultation with concerned departments.

**LIST OF PAPERS PUBLISHED/ACCEPTED
FOR PUBLICATION
DURING APRIL, 2024 – MARCH, 2025
AND
APRIL – MAY, 2025**

LIST OF PAPERS PUBLISHED DURING 2024-25 & 2025-26

S. No.	Item	Published Papers in 2024-25	Published Papers in 2025-26 (April-May)
1.	International Journal	113	04
2.	National Journal	07	00
3.	International Conference/ Seminar/ Symposium	186	07
4.	National Conference/ Seminar/ Symposium	10	00
5.	Books/Chapters	33	01
6.	Other Publications	06	00
	Total	355	12

BOOKS

1.	Agarwal, A., Yadav, B., Nema, M., Sharma, M., & Kumar, A. (Eds.) (2024). Towards Water Circular Economy: Proceedings of the Responsible Water Management and Circular Economy (RWC) 2024, Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-60436-2
2.	Kumar, M., Kuroda, K., Mukherjee, S., Ngiehm, L. D., Vithanage, M., & Tyagi, V. K. (Eds.) (2024). Wastewater Surveillance for Covid-19 Management. Springer.
3.	Pingle, S., Patidar, N., Sumant, K., Krishan, G., Khobragade, S. D., Sharma, A., & Rao, M. S. (2025). Abstract book of Proceedings of International Groundwater Conference (IGWC-2025) “Groundwater Vision 2047: Towards Water Security under Changing Climate” during 05-07 March, 2025 at NIH Roorkee
4.	Singh, V. P., Singh, R., Paul, P. K., Bisht, D. S., & Gaur, S. (2024). Hydrological Processes Modelling and Data Analysis. Water Science and Technology Library, 127.
5.	Srivastav, R., & Nayak, P. C. (2024). Applications of Machine Learning in Hydroclimatology. Springer International Publishing AG.

CHAPTERS IN BOOKS

1.	Balasundaram, G., Tyagi, V. K., & Lo, S. L. (2024). Biogas Production from Sewage Sludge: Advances in Thermal Pretreatment. In Environmental Materials and Waste: Circular Economy and Pollution Abatement (pp. 289–314). Academic Press (Elsevier).
2.	Behera, A. K., Pradhan, R. M., Pradhan, B., Sahoo, P. K., & Kumar, P. (2024). Hydrogeochemical Characterization of Groundwater in Ambagarh Regions: Mining-Rich State Chhattisgarh, India. In Mining Impacts and Their Environmental Problems (pp. 174–185). Capital Publishing.
3.	Behera, A. K., Pradhan, R. M., Pradhan, B., Sahoo, P. K., & Kumar, P. (2025). Hydrogeochemical Characterization of Groundwater in Ambagarh Regions: Mining-Rich State Chhattisgarh, India. In Mining Impacts and their Environmental Problems (pp. 153-163). Cham: Springer Nature Switzerland.
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4.	Patil, J. P., Venkatesh, B., & Abhilash, R. (2024). Hydrological Research in the Western Ghats of India by National Institute of Hydrology, Belagavi, Jal Charcha Magazine, (August-September 2024).
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1.	Choudhary S., Pingale S.M., Khare D. Krishan R. (2025) Quantification of the surface and groundwater dynamics of Upper Godavari Sub-Basin using SWAT-MODFLOW and CMIP6 climate change scenarios. <i>Hydrological Sciences Journal, Taylor & Francis</i> . https://doi.org/10.1080/02626667.2025.2492891 . Scopus indexed. Impact factor = 3.9.
2.	Jena, Ananya, Naresh Kumar Sahoo, Prasanta Kumar Sahoo, Soumya Mishra, Prangya Ranjan Rout, Yulin Zhong, 2025. Design of a novel green synthesized ZVS/S-rGO - Deinococcus radiodurans R1 chitosan hydrogel beads for enhanced recovery of europium, Journal of Cleaner Production, 145367 (https://doi.org/10.1016/j.jclepro.2025.145367).
3.	Singh, P., Balan, D., Ojha, R., Srivastava, R., Tripathi, S., Guha, S., Krishan, G., and Rao, M.: Evapotranspiration partitioning using stable isotopes of O and H, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-14569, https://doi.org/10.5194/egusphere-egu25-14569 , 2025
4.	Singh, V., Nagale, D.S., Singh, J., Jain, S.K. and Dimri, A.P., 2025. Coupling of downscaled GRACE data with SPHY derived hydrological components to generate snow water equivalent in the Himalayan catchment. <i>Advances in Space Research</i> . https://doi.org/10.1016/j.asr.2025.04.059

NATIONAL JOURNAL	

INTERNATIONAL CONFERENCE	
1.	Ahirwar, H. R., Singh, A. P., Nema, M. K., and Nema, A. K.: Mapping Soil Porosity: Unveiling India's Soil Dynamics with Remote Sensing, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-1089, https://doi.org/10.5194/egusphere-egu25-1089 , 2025
2.	Aswal, Sonali, Nitin Kamboj, Kalzang Chhoden (2025). Evaluation of Ground water Contamination in the Vicinity Area of Sarai Municipal Solid Waste Dumping Site, Haridwar District, Uttarakhand, International Conference on Innovations and Sustainability in Civil Engineering (ISCEST), National Institute of Technology, Patna, May 14-16, 2025
3.	Dahiwal, A. V., Nema, S., Jatav, M.S., Choudhary, S.S., Barman, D., Rao, M.S., and Sharma, A. (2025). “Modeling Flash Flood Events in The Arid and Semi-Arid Regions of the Luni River Basin India,” European Geosciences Union, EGU 2025, 27 April – 02 May, Vienna, Austria & Online.
4.	Krishan, Gopal. 2025. Application of environmental tracers in sustainable water resources management. In sustainability fair 3.0--5th international sustainability

	conference on health, safety, fire, and environmental advances (HSFEA 2025), UPES Dehradun during April 9-10, 2025
5.	Maza, Minotshing, Pankaj Mani & J. P. Patra (2025). “Water availability assessment at selected sites of Falgu river in upper catchment in Bihar”. International Conference on Innovations and Sustainability in Civil Engineering: Shaping Tomorrow’s Infrastructure at NIT Patna from 14-16 May, 2025. (Won Best paper award)
6.	Rajkumar, G. A., Nema, M. K., and Khare, D.: Exploring Dynamics of Climate and Atmosphere Employing the Temperature Indices Using Bias-Corrected GCMS and Ensemble Model Approach, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-957, https://doi.org/10.5194/egusphere-egu25-957 , 2025.
7.	Shaurabh, Shubham, Pankaj Mani & J. P. Patra (2025). “Shifting analysis of a river in Tarai region using spatio-temporal satellite imageries work”. International Conference on Innovations and Sustainability in Civil Engineering: Shaping Tomorrow’s Infrastructure at NIT Patna from 14-16 May, 2025. (Won Best paper presentation award)

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	BOOK CHAPTER
1.	Aziz K., Mir R. A., N. Aziz, and Yattoo S A (2025) Application of Wireless Sensor Networks to Monitor Landslides under Changing Climate.,” in Environmental Sensor Technologies: Applications and Challenges to Counter Climate Change, volume 1, published under AAP and CRC Taylor and Francis Group., Editors: S. A. Shameem, Saleem Ahmad Yattoo, Khalid Rehman Hakeem, Hard ISBN: 9781779641489 Pages: Est. 332pp w/index

	BOOK

**LIST OF WORKSHOPS/ TRAINING COURSES/
SYMPOSIA ATTENDED/ORGANISED
DURING APRIL, 2024 – MARCH, 2025
AND
APRIL – MAY 2025**

TRAINING COURSE/WORKSHOPS/ BRAIN STORMING SESSIONS ORGANISED
DURING 2024-25

SN.	ACTIVITES	PERIOD	VENUE
INTERNATIONAL ACTIVITIES			
1.	Capacity Building Workshop on ‘Climate Resilient Hydrological Systems in Punjab’	12 April, 2024	Chandigarh
2.	Workshop on ‘Resilience of Flooding from Persistent Heavy Monsoon Rain in Northwest India’-Sponsored by BGS, UK	18 July, 2024	Chandigarh
3.	Organized and Participated in a Workshop on ‘Himalayan Freshwaters’-Under the APN Project	21 May, 2024	Nepal Engineering College, Nepal
4.	Workshop on ‘Resilience of Flooding from Persistent Heavy Monsoon Rain in Northwest India’-Sponsored by BGS, UK	03 March, 2025	Chandigarh
5.	10 th International Groundwater Conference (IGWC-2025) ‘Groundwater Vision 2047: Towards Water Security under Changing Climate’	05-07 March, 2025	NIH Roorkee
NATIONAL ACTIVITIES			
CONFERENCES/SEMINARS/SYMPOSIA/WORKSHOPS			
1.	One Week Training Workshop on ‘Springshed Management’	02-06 July, 2024	NEHARI, Brahmaputra Board, Guwahati, Assam
2.	One day workshop on ‘Space Technology for Sustainable Water Resources Management’-In collaboration with WRD, Meghalaya	13 August, 2024	State Convention Centre, Shillong
3.	One day Workshop titled ‘Microplastics the Menace’	22 August, 2024	NIH Roorkee
4.	A Workshop on ‘Advances in River Cross Section and Discharge Measurement’	10 October, 2024	NIH Roorkee
5.	National Seminar on ‘Advances in Irrigation Technologies and Management’ -In collaboration with NERIWALM, CWC, CGWB, Brahmaputra Board	29-30 November, 2024	Assam Water Centre, Guwahati
6.	Workshop on the ‘Impacts of Climate Change on Glacial Lake Outburst Floods (GLOFs)’ Organized Jointly under the aegis of Bharat Singh Chair, Department of WRD&M, IIT Roorkee & National Institute of Hydrology Roorkee	09 December, 2024	NIH Roorkee

7.	National Level ‘Sixth Workshop on First Spring Census’-Jointly organized by NWRC, Jodhpur and NIH-HQ	07-09 January, 2025	Jaipur
8.	One day workshop on ‘Training and Research Needs Assessment’-In collaboration with NERIWALM	07 February, 2025	NIRD, Guwahati
TRAINING COURSES			
1.	Site Suitability Mapping using G-MCDA	29-30 April, 2024	NIH Roorkee
2.	Cryospheric Modeling and Hazard Assessment-Jointly organized by NIH, Roorkee and COEDMM, IIT Roorkee	06-11 May, 2024	NIH Roorkee IIT Roorkee
3.	Principles of operations of IRMS	14-15 May, 2024	NIH Roorkee
4.	Hydrological Modelling using SWAT in the context of Climate Change	03-08 June, 2024	NIH, Roorkee
5.	Government e-Marketplace (GeM) Portal Functionalities	11-12 June, 2024	NIH, Roorkee
6.	Hydrological Modelling using QSWAT	10-14 June, 2024	NIH-NERC, Guwahati
7.	Hands-On Training of ICP-MS and GC-MS for Scientific Cadre Officials of CWC (4 th Batch)	17-21 June, 2024	NIH, Roorkee
8.	Hydrological Modelling using Soil and Water Assessment Tool (SWAT)	24-28 June, 2024	NIH-NWRC, Jodhpur
9.	Constructed Wetlands: Principal, Design, Operation and Maintenance	01-05 July, 2024	NIH Roorkee
10.	Python Essentials for Hydrology	15-19 July, 2024	NIH, Roorkee
11.	Environmental Tracers in Water Resources Management-Sponsored by BGS, UK	24-26 July, 2024	NIH, Roorkee
12.	Hydrological Modelling using Satellite-based and Reanalysis Data Products	05-09 August, 2024	NIH, Roorkee
13.	Conservation & Management of Inland Water Bodies	05-09 August, 2024	NIH, Roorkee
14.	Hydrological Design Aids Programme	05-09 August, 2024	NIH-HRRC, Belagavi
15.	Water Isotope Analysis using the Laser Based Abb LGR Isotopic Water Analyser (Oa Icos)	07 August, 2024	NIH, Roorkee
16.	Quantulus 1220 Training	12 August, 2024	NIH, Roorkee
17.	Hydroclimatic Indices and Extreme Analysis for Climate Change Assessment using Python & R	12- 17 August, 2024	NIH, Roorkee

18.	Hands-On Training of ICP-MS and GC-MS for Scientific Cadre Officials of CWC (5 th Batch)	19-23 August, 2024	NIH, Roorkee
19.	Use of Geospatial Technologies in Flood Management and Erosion Control-In collaboration with NEHARI, Guwahati	20-24 August, 2024	NEHARI, Brahmaputra Board, Guwahati, Assam
20.	Google Earth Engine for Beginners	21-23 August, 2024	Virtual Mode (NIH-WHRC, Jammu)
21.	Water related Disaster Risk Reduction Concepts, Techniques and Adaptation Strategies-Jointly organized with NIDM, New Delhi	27-31 August, 2024	NIH, Roorkee
22.	Advanced Instrumentation Techniques for Water Quality Monitoring	02-06 September, 2024	NIH, Roorkee
23.	Advanced Groundwater Flow Modeling	02-06 September, 2024	NIH, Roorkee
24.	Remote Sensing and GIS in Glacier GLOF studies	09-11 September, 2024	Virtual Mode (NIH-WHRC, Jammu)
25.	Training program on 'MATLAB Software'	23-27 September, 2024	NIH, Roorkee
26.	Source Sustainability for Jal Jeevan Mission Schemes	24-28 September, 2024	NEHARI, Brahmaputra Board, Guwahati, Assam
27.	Preparation of EAP for Earthen Dams	24-28 September, 2024	SWDC-WRD, Chhattisgarh, Raipur
28.	Advanced Geophysical Instrumentation for Hydrogeological Applications	25-29 September, 2024	NIH Roorkee
29.	2-days Enablement Activity under ESRI India Customer Success Program under NHP on 'Leveraging ArcGIS Enterprise Functionalities for Effective Knowledge Dissemination And Data Management'	30 September - 01 October, 2024	NIH, Roorkee
30.	g on 'Hydrological Modeling' in association with NERIWALM, Tezpur, Assam	30 September - 04 October, 2024	NERIWALM, Tezpur, Assam

31.	Geo Innovation Challenge Program on the Theme: 'Intervention of Geospatial Technology for Water Resources'-Sponsored by DST	03-05 October, 2024	NIH, Roorkee
32.	Tools and Techniques for Springshed Management	07-11 October, 2024	NEHARI, Brahmaputra Board, Guwahati, Assam
33.	Hydrology of Ungauged Basins	25-30 November, 2024	NIH, Roorkee
34.	Training program on 'MATLAB Software'	25-29 November, 2024	NIH , Roorkee
35.	Urban Flood Management and Mitigation Measures	27-29 November, 2024	NIH-DRC, Kakinada
36.	Liquid Nitrogen Plant	29 November, 2024	NIH, Roorkee
37.	Weather and Climate Data Science: Advanced Practices and Analysis Tools	02-06 December, 2024	NIH, Roorkee
38.	Training Programme for the Newly Recruited WRD Engineers from META Nashik, Maharashtra, on the Topic: Water Resources Planning and Management	02-15 December, 2024	NIH, Roorkee
39.	Regional Training of First Spring Census for North East States	03-05 December, 2024	Agartala
40.	Sewage Treatment and Sludge Management under Circular Economy	09-13 December, 2024	NIH, Roorkee
41.	Basics of Hydrological Modelling	11-13 December, 2024	NIH-WHRC, Jammu
42.	Water Isotope Analysis (Oxygen-18, Deuterium, Tritium) and its Application in Water Resources Management-Sponsored by IAEA Vienna (United Nations Programme)	23-27 December, 2024	NIH, Roorkee
43.	Regional Training of First Spring Census for North States	26-28 December, 2024	Chandigarh
44.	Regional Training of First Spring Census for East States	15-17 January, 2025	Kolkata

45.	Faculty Development Programme (ATAL FDP) on 'Navigating Climate Variability and Impacts for Effective Water Management, Disaster Preparedness, Resilience and Mitigation'	28 January-02 February, 2024	Hybrid Mode (Pune)
46.	Training Programme for the Newly Recruited WRD Engineers from META Nashik, Maharashtra, on the Topic: Water Resources Planning and Management	09-19 February, 2025	NIH, Roorkee
47.	Catchment Flood Modeling using VIC and HEC-RAS	10-14 February, 2025	NIH-CFMS, Patna
48.	Cryosphere, Climate Change and Hazards (CCCH-25): Theory & Practice	17-21 February, 2025	NIH-WHRC, Jammu
49.	Applications of RS and GIS for Soil Erosion Modelling	17 -21 February, 2025	Virtual Mode (NIH-NWRC, Jodhpur)
50.	Training of Trainers (TOT) Programme on 'Advanced training on Glaciers and Glacial Lakes Observations for Sustainable Water Resource Management'	24 February – 01 March, 2025	NIH, Roorkee
51.	Solute Transport Modelling	03-04 March, 2025	NIH, Roorkee
52.	Groundwater Flow and Mass Transport with FEEFLOW	03-04 March, 2025	NIH, Roorkee
53.	ET-Based Irrigation Performance Assessment Tools- Jointly organized by NWA, Pune and NWRC, Jodhpur	10-13 March, 2025	NWA, Pune
54.	Hydrological Modeling: HEC-HMS, HEC-RAS and Machine Learning (HyMHECMaL 2025)	24-28 March, 2025	NIH, Roorkee
55.	1 st National HimSchool on 'Cryosphere & Climate Change Studies' (NHC3S-1: 2025)	24-28 March, 2025	NIH, Roorkee
BRAIN STORMING SESSIONS			
1.	Webinar by Israeli Experts on 'Efficient Water and Wastewater Supply and Use'	12 September, 2024	NIH, Roorkee
2.	Webinar by Israeli Experts on 'Salinity and Wastewater Improvement and Management & Hydrologic Data Cooperation'	01 October, 2024	NIH, Roorkee
3.	Webinar by Israeli Experts on 'Groundwater Hydrology: Data Analysis and Management'	08 October, 2024	NIH, Roorkee
4.	Brainstorming Session on 'Monitoring of Glaciers'	28 November, 2024	NIH, Roorkee
5.	Brainstorming Session on 'How to Improve Visibility of National Institute of Hydrology,	16 December, 2024	NIH Roorkee

	Roorkee' and 'Vision 2047' Organized during Foundation Day Celebration of NIH		
OTHER ACTIVITIES			
1.	Hands-on Demonstration of the CHNS Analyser	06 September, 2024	NIH, Roorkee
2.	NWRC Jodhpur showcased its R&D capabilities and promoted capacity building in field of water management at the 'Shashakt Rajasthan' Mega Expo held at Abu Road (Received the Best Stall Award)	16-19 October, 2024	Abu Road, Rajasthan
3.	Demonstration of Web-Based Systems for Site Suitability Analysis for MAR and Integrated Hydrologic Modelling at CGWB, Faridabad	30 January, 2025	CGWB, Faridabad

TRAINING COURSE ORGANISED DURING 2025-26 (April-May)

S.No.	Title of the course	Date	Venue
1.	Workshop on “Enhancing Water Use Efficiency in Agriculture: Strategies, Technologies and Field Application” jointly organized by Dept. of WRDM, IITR and NIH, Roorkee under the aegis of Bharat Singh Chair	April 10, 2025	WRDM Dept., IITR and at NIH, Roorkee
2.	Co-organized a training on ‘ET-based Irrigation Performance Assessment Tools’ jointly with World Bank & CWC, for State WRD officials	April 7-12, 2025	World Bank, New Delhi
3.	Inception Workshop on “Strategies and Approaches for effective Springshed management”,	April 21-23, 2025	Goa
4.	Co-organized a 5-day training program on “GIS and Remote Sensing Applications in Water Resources Sector” in collaboration with NEHARI, Brahmaputra Board	April 22-26, 2025	NEHARI, Guwahati, Assam.
5.	Training course on ‘ET-based Quick Irrigation Performance Assessment (EQIPA) Hand-Holding Knowledge Transfer Sessions’	May 13-16, 2025	NIH, Roorkee.
6.	8 th edition of the training course on “Hydrological Modeling Using SWAT in the Context of Climate Change”	May 19-24, 2025	NIH, Roorkee
7.	Workshop on ‘Assessing the impact of solar powered irrigation on groundwater resources in southwest Punjab’ sponsored by University of Paris, SaClay, France	May 23, 2025	Chandigarh
8.	2-day Knowledge Transfer (KT) Workshop on NIH-ISHVAR portal (developed on ArcGIS enterprises) platform	May 21-22, 2025	NIH, Roorkee
9.	5-day training on EQIPA & EDIPA for various state officials of Assam. The training program were jointly organized by NIH, CWC, and Irrigation Department of Assam. The participants from Irrigation Department of Assam, NERIWALM, ASSAC, and CWC.	May 26-30, 2025	Chandmari, Guwahati, Assam.
10.	5-day training course entitled “Dam Break Analysis and Preparation of A.P. for WRD, Gujarat”	May 26-30, 2025	NIH, Roorkee
11.	4-day training program on ‘Operation Analysis of Reservoir Systems’ in collaboration with NWA, Pune based on NIH ReSyP software	May 27-30, 2025	NWA, Pune

