

## NATIONAL INSTITUTE OF HYDROLOGY, ROORKEE

### Minutes of the 54<sup>th</sup> Meeting of NIH Working Group (22-23 Feb., 2024)

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

#### ITEM NO. 54.1: OPENING REMARKS BY THE CHAIRMAN

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

S. No.	Member	Suggestion(s)
1.	Dr. Bhishm Kumar	<ul style="list-style-type: none"><li>▪ Suggested to carry out extensive review while planning a new study</li><li>▪ Suggested to include beneficiary in all studies</li><li>▪ Develop a database and share it in the public domain</li><li>▪ Suggested to take up collaborative studies as team and avoid isolated studies</li></ul>
2.	Dr. Manoj P. Samuel	<ul style="list-style-type: none"><li>▪ Need to work together with related organisations to overcome challenges of climate change.</li><li>▪ Suggestion for data base and data sharing</li></ul>
3.	Sh. Sudhindra Mohan Sharma	<ul style="list-style-type: none"><li>▪ Dissemination of knowledge/R&amp;D output from lab to field for benefit of public/stakeholders</li><li>▪ To carry out studies in focussed areas including the wetlands</li></ul>
4.	Prof. S.S Grewal	<ul style="list-style-type: none"><li>▪ To do R&amp;D keeping in view the need of common man and other stakeholders</li></ul>
5.	Prof. M.L. Kansal	<ul style="list-style-type: none"><li>▪ Suggestion for carrying out inter-division &amp; collaborative R&amp;D work</li></ul>
6.	Dr. (Mrs.) Sadhana Malhotra	<ul style="list-style-type: none"><li>▪ The WG meeting can be held for three days instead of two days in order to give more time for presentations and subsequent discussions.</li><li>▪ The suggestions/ recommendations by the experts in the previous meeting, and the action taken, should be mentioned during the presentations of ongoing studies.</li><li>▪ PERT/CPM and Gantt charts can be useful tools to plan and apply in all the research studies so that they are completed on time.</li><li>▪ Deliverables for stakeholders may be clearly delineated in all the presentations.</li><li>▪ A few short films can be regularly made highlighting some of the studies and uploaded on the NIH website, youtube and other social media for wider circulation and benefit of the society at large.</li><li>▪ Engagement of retired scientists to utilize their experience/knowledge for Institute's R&amp;D activities</li></ul>
7.	Prof. Ramakar Jha (online)	<ul style="list-style-type: none"><li>▪ The scientific divisions should plan to write text books in their domain areas of R&amp;D</li><li>▪ Suggestion to convert R&amp;D works in IS codes</li></ul>
8.	Dr. Praveen Thakur	<ul style="list-style-type: none"><li>▪ To carry out collaborative research</li><li>▪ Assured full support to NIH for studies involving application of RS&amp;GIS with state of art applications and facilities</li><li>▪ Encouraged to utilise all features of SWAT model for water quantity as well as for water quality aspects of watersheds</li><li>▪ Induction training of Scientists</li></ul>
9.	Er. Pankaj Kumar Sharma	<ul style="list-style-type: none"><li>▪ Appreciated for having nice interactions with NIH during WG</li><li>▪ Need to devise a mechanism for data sharing b/w CWC &amp; NIH</li></ul>

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

**ITEM No. 54.2: CONFIRMATION OF MINUTES OF 53<sup>rd</sup> MEETING OF WORKING GROUP**

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

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

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

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

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

**CENTRE FOR CRYOSPHERE AND CLIMATE CHANGE STUDIES (C4S)**

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

**Progress of Work Program for 2023-24**

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

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

**Recommended Work Programme for the Year 2024-25**

<b>S. No.</b>	<b>Title of Project/Study</b>	<b>Study Team</b>	<b>Duration</b>	<b>Funding</b>
<b>Internal Studies</b>				
1.	Ascertaining the efficacy of use of State-of-the-art technologies for spring mapping and sustainability of springs through suitable interventions	SS Rawat (PI), SM Pingale, PK Mishra, DS Bisht, Rajesh Singh	3 years (04/22-03/25) Ongoing	NIH
2.	Geo-Hydro-Chemical and Isotopic aspects of occurrence of Springs: A case study from the major settlement areas of Bhagirathi basin, Uttarakhand, India	SS Rawat (PI), Suhas Khobragade, MK Sharma, MS Rao, SM Pingale, PK Mishra	03 Years (04/23-03/26) Ongoing	NIH
3.	Climate Change Scenarios for Andhra Pradesh and its impact on streamflow and groundwater levels in Pennar River Basin	Sunil Gurrapu (PI) YRS Rao, RV Ramana, Nitesh Patidar, TVNAR Kumar, CE, WRD, AP	02 years (04/22-09/24) Ongoing	NIH
4.	Real-time monitoring of snow-glacier related parameters and Ensemble Hydrological Modeling (EHM) to study the Triloki Group of Glaciers and Khatling glaciers part of Western Himalaya, India under climate change scenarios	Vishal Singh (PI), Surjeet Singh, Sunil Gurrapu, Lavkush Patel, Akshaya Verma, Madhusudan Thapliyal	05 Years (03/23-02/28) Ongoing	NIH
5.	Investigation on occurrences of extreme rain events across Northwest Himalaya in relation to global atmospheric thermal and circulation changes	Ashwini Ranade (PI), PK Mishra, Sunil Gurrapu	03 years (04/22-03/25) Ongoing	NIH
6.	Early Signatures of 21st Century on Snow Cover Dynamics in Zaskar River Basin, Ladakh	DS Bisht (PI) PG Jose	03 years (07/21-06/24)	NIH
7.	Comparative Analysis of Fine Scale Satellite & Reanalysis Precipitation Products in Upper Ganga Basin using Multi-criterion Decision-Making	DS Bisht (PI) MK Goel	02 years (06/22-06/24)	NIH
8.	Monitoring and Modelling of the Gangotri glacier catchment under different Climate Scenarios	Lavkush Kr Patel (PI), Akshaya Verma, Vishal Singh, Kapil Kesarwani, Surjeet Singh, Jatin Malhotra	03 years (04/23-03/26) Ongoing	NIH
9.	Updation of Glaciers and Glacial Lakes in Indian Himalayan Region	Surjeet Singh (PI), Vishal Singh, Lavkush Kr Patel, Akshaya Verma, M. Thapliyal	02 years (04/24-03/26) New	NIH
10.	Assessment of Hydrological Extremes and Impact on Future Water Availability in Pennar River Basin under Changing Climate	Sunil Gurrapu (PI), Surjeet Singh, Vishal Singh, YRS Rao, RV Ramana, M. Thapliyal, TVNAR Kumar, CE, WRD, GoAP	01 year (04/24-03/25) New	NIH

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

## ENVIRONMENTAL HYDROLOGY DIVISION

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

### Progress of Work Program for 2023-24

S.No.	Study	Recommendations/Comments
<b>Sponsored Projects (Ongoing)</b>		
1.	<p><b>Title:</b> Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)</p> <p><b>Study Group:</b> Omkar Singh (PI), Rajesh Singh, Jyoti P Patil, VK Tyagi, Kalzang Chhoden, Rajesh Agarwal</p> <p><b>Partners:</b> MNIT-Jaipur, IIT-Bombay, IRMA-Anand</p> <p><b>Duration:</b> 5 Years (04/19-09/24), Sought extn. for 6 months.</p> <p><b>Project Cost:</b> 5.1 Crores</p> <p><b>Sponsored by:</b> DST</p> <p><b>Status:</b> In-progress</p>	Dr. Rajesh Singh presented the progress of the study and the outcomes in the Working Group meeting. The WG members appreciated the outcomes of the study and emphasized the need for such types of studies to deal with the deteriorating water quality of water bodies. The members also visited the experimental sites of the study.
2.	<p><b>Title:</b> Irrigation Efficiency Improvement for Medium Irrigation Project (MIP) Shahnahar, H.P.</p> <p><b>Study Group:</b> R. P. Pandey, (PI), J. P. Patra, Rajesh Singh, Shakti Suryavanshi, SK Kumre</p> <p><b>Duration:</b> 3 Years (12/17-05/23), Further Extension to be Requested due to late installation of field instruments</p> <p><b>Project Cost:</b> 75 Lakh</p> <p><b>Sponsored by:</b> NHP</p> <p><b>Status:</b> In-progress</p>	Dr. R. P. Pandey briefed about the progress of the project and the extension has been requested to the sponsoring agency up to Dec 2024. The PI informed that the title of the project has been revised.
3.	<p><b>Title:</b> Anaerobic co-digestion of wastewater treatment plant sludge and organic fraction of municipal solid waste: Effect of thermal-chemical pretreatment on process performance and microbial community development</p> <p><b>Study Group:</b> Vinay Kumar Tyagi (PI)</p> <p><b>Duration:</b> 5 Years (04/2018 - 03/2023)</p> <p><b>Sponsored by:</b> DBT; <b>Project Cost:</b> 106.5 Lakh</p> <p><b>Status:</b> In-progress</p>	Dr. Vinay Tyagi briefed about the progress of the project and the extension has been requested to the sponsoring agency up to Jun 2024.
<b>Collaborative Sponsored Projects (Ongoing)</b>		
4.	<p><b>Title:</b> Isotopic and geochemical approach to study vulnerable confined and unconfined drinking water aquifers in Varanasi and surrounding area, India</p> <p><b>Study Group:</b> Rajesh Singh (PI), R.P. Pandey</p> <p><b>Collaborators:</b> BHU, Varanasi (Lead), BARC, Mumbai, ICER, Hungary.</p> <p><b>Duration:</b> 3 Years (07/21-06/24)</p> <p><b>Sponsored by:</b> BHU; <b>Status:</b> In-progress</p>	Dr. Rajesh Singh reported that this study is in progress in collaboration with other institutions.
5.	<p><b>Title:</b> SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resources recovery for India</p> <p><b>Study Group:</b> Vinay Kumar Tyagi (Co-PI) A.A.Kazmi (PI, IITR)</p> <p><b>Duration:</b> 4 Years (03/20-06/24); <b>Sponsored by:</b> DST</p> <p><b>Project Cost:</b> 175.0 Lakh; <b>Status:</b> In-progress</p>	Dr. Vinay Tyagi briefed about the progress of the project.

6.	<p><b>Title:</b> Comprehensive characterization of variably processed sewage sludge in Ganga basin to classify its suitability for safe disposal</p> <p><b>Study Group:</b> Vinay Kumar Tyagi (Co-PI), A.A.Kazmi (PI, IITR)</p> <p><b>Duration:</b> 02 Years (01/22-03/24)</p> <p><b>Sponsored by:</b> CPCB &amp; NMCG; <b>Status:</b> In-progress</p>	Dr. Vinay Tyagi briefed about the progress of the project.
<b>Internal Study (Ongoing)</b>		
7.	<p><b>Title:</b> Characterization of Groundwater Dynamics in Krishna-Godavari Delta interims using groundwater levels, Hydrochemistry, Isotopes and Emerging Contaminants</p> <p><b>Study Group:</b> M. K. Sharma, (PI), Suhas Khobragade, Rajesh Singh</p> <p><b>Duration:</b> 2 Years (04/22-03-24)</p> <p><b>Status:</b> In-progress</p>	<p>Dr. M. K. Sharma presented the progress and the findings of the study. The members appreciated the work.</p> <p>Dr. S Grewal suggested to share the findings of the study with the stakeholder (farmers etc.) to realize the ground level scenario of water pollution. Dr. Sharma informed that after report submission, a workshop is planned for sharing the findings with stakeholders.</p>
8.	<p><b>Title:</b> Understanding Arsenic mobilization in groundwater of Haridwar and formulating remediation measures</p> <p><b>Study Group:</b> Rajesh Singh (PI), R. P. Pandey, Sumant Kumar, Pradeep Kumar, M. K. Sharma, V. K. Tyagi, Kalzang Chhoden</p> <p><b>Duration:</b> 3 Years (07/21 – 06/24), <b>1 Year extension was requested by PI</b></p> <p><b>Project Cost:</b> 30.1 Lakh</p> <p><b>Status:</b> In-progress</p>	<p>Dr. Rajesh Singh presented the progress of the study. Members made following suggestions:</p> <p>Dr. Sudhindra Mohan Sharma, Ex-Nodal Officer, MoDWS, Indore suggested correlating As concentration with the drainage of the study area.</p> <p>Dr. Bhishm Kumar, IAEA (Retd.) suggested isotope analysis to understand the recharge in the aquifers.</p> <p>Dr. Samuel suggested to consider remediation of As through ex-situ treatment or others.</p>
9.	<p><b>Title:</b> Simulation of Non-Point Source Pollution Processes in Song River</p> <p><b>Study Group:</b> Pradeep Kumar, (PI), M.K. Sharma, Rajesh Singh</p> <p><b>Duration:</b> 4 Years (11/19-10/23)</p> <p><b>Extension up to Jun 2024 for submission of report</b></p> <p><b>Status:</b> In-progress</p>	Dr. Pradeep Kumar presented the progress and the findings of the study. The PI requested to grant extension up to June 2024 for report submission to include the outcome of village level surveys.
10.	<p><b>Title:</b> Hydrological Studies for the Conservation of Rewalsar Lake</p> <p><b>Study Group:</b> Kalzang Chhoden (PI), Rajesh Singh, R. P. Pandey, Pradeep Kumar, Vinay Kumar Tyagi, Omkar Singh, Suhas Khobragade, D.S. Malik (GKU, Haridwar)</p> <p>Collaborator: HPSWA, Shimla</p> <p><b>Duration:</b> 3 Years (04/23-03/26)</p> <p><b>Project Cost:</b> 53.16 Lakhs</p> <p><b>Status:</b> In-progress</p>	Dr. Rajesh Singh presented the progress of the study and future planned activities. There were no specific comments /suggestions.
11.	<p><b>Title:</b> Comprehensive evaluation of disinfection units of STPs in Ganga basin: Formation &amp; Control of emerging oxidation precursors.</p> <p><b>Study Group:</b> Vinay Kumar Tyagi (PI), Rajesh Singh, Mukesh K. Sharma, Pradeep Kumar, J. P. Patra, Kalzang Chhoden, R.P.Pandey (NIH)</p>	Dr. V. K. Tyagi presented the progress of the study and future planned activities.



	Bhanu P Vellanki and A.A Kazmi (IITR) <b>Duration:</b> 3 Years (04/2023 – 03/2026) <b>Project Cost:</b> 73.66 Lakh <b>Status:</b> In-progress	
<b>Proposed New Studies (Internal)</b>		
12.	<b>Title:</b> Nanotechnology-enabled Multifunctional Materials for the Detection and Remediation of Arsenic in Contaminated Water <b>Study Group:</b> Prasanta Kumar Sahoo (PI), R. P. Pandey, M. K. Sharma, Rajesh Singh, Pradeep Kumar, Vinay Kumar Tyagi, Kalzang Chhoden, Sumant Kumar <b>Duration:</b> 3 Years (04/24-03/27) <b>Project Cost:</b> 73.7 Lakh <b>Status:</b> Proposed	Dr. Prasanta Kumar Sahoo presented the proposed plan of study to the Working group. The members agreed on the objectives and requirements of the suggested study and appreciated the proposed work. There were no specific comments /suggestions.
13.	<b>Title:</b> Land and water management plan for rejuvenation of river Tilodki Ganga, Ayodhya <b>Study Group:</b> Dr. Shakti Suryavanshi, Dr. Shailendra K. Kumre, Dr. R. P. Pandey, Dr. Pradeep Kumar, Dr. Rajesh Singh, Dr. M. K. Sharma, Dr. Kalzang Chhoden, Dr. Nitesh Patidar, Dr. V. K. Tyagi <b>Duration:</b> 3 Years (04/24-03/27) <b>Project Cost:</b> 36.6 lakh <b>Status:</b> Proposed	Dr. Shakti Suryavanshi presented the proposed plan of study to the Working group. The members suggested to share the results of study with implementation agency for its practical utility. The title of the study is proposed to be modified as “Land and Water Management Plan for Rejuvenation of River Manorama”.
14.	<b>Title:</b> Groundwater Quality Assessment of Tripura with Special Reference to Arsenic and Fluoride <b>Study Group:</b> Rajesh Singh (PI), V. K. Tyagi, M. K. Sharma, P. K. Sahoo, Kalzang Chhoden, S. Suryavanshi NIH-NERC: Sanjay K. Sharma, S. Barman, W. R. Singh TSPCB, Tripura: Rajib Paul <b>Duration:</b> 3 Years (05/2024 – 04/2027) <b>Project Cost:</b> 33.8 Lakh <b>Status:</b> Proposed	Dr. Rajesh Singh presented the proposed plan of study. The Working Group agreed on the objectives and need of the proposed study. Dr. Bhism Kumar, IAEA (Retd.) and Dr. Manoj P. Samuel, CWRDM, Kozhikode suggested to include solutions for As and F removal in the objective.
15.	<b>Title:</b> Comprehensive Hydrological Study for River Health Assessment and Development of Environmental Management Plan for River Yamuna <b>Study Group:</b> Pradeep Kumar (Lead-PI) and team of scientists from EHD, GWHD & HI <b>Duration:</b> 5 Years (05/2024 – 03/2029) <b>Project Cost:</b> 538.7 Lakh <b>Status:</b> Proposed	Dr. Pradeep Kumar presented the proposed plan of activities for the study. The members appreciated the work proposed to be undertaken and suggested to include CGWB, CWC, Yamuna Basin Organization (YBO) and the Stakeholder State Departments also.

**Recommended Work Programme for the Year 2024-25**

S. No.	Study Title	Study Team	Duration/Status
<b>Sponsored R&amp;D Projects (Ongoing)</b>			
1.	Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)	Omkar Singh (PI), Rajesh Singh (Co-PI), Jyoti P Patil, VK Tyagi, Kalzang Chhoden, Rajesh Agarwal  <b>Partners:</b> NIH, MNIT-Jaipur, IIT-Bombay, IRMA-Anand	5 Years (04/19 - 09/24) Sought extn. for 6 months. <b>Project Cost:</b> 5.1 Crore <b>Sponsored by:</b> DST <b>Status:</b> In-progress
2.	Irrigation Efficiency Improvement for Medium Irrigation Project (MIP) Shahnehar, H.P.	RP Pandey (PI), J P Patra, Rajesh Singh, Shakti Suryavanshi, SK Kumre, NK Bhatnagar	12/17 - 06/24 <b>Project Cost:</b> 75 Lakh <b>Sponsored by:</b> NHP <b>Status:</b> In-progress
3.	Anaerobic Co-digestion of Thermochemically Pretreated Organic Fraction of Municipal Solid Waste and Sewage Sludge: Effect on Process Performance and Microbial Community Development	Vinay Kumar Tyagi (PI)	6 Years (2018-2024) <b>Project Cost:</b> 106 Lakhs <b>Sponsored by:</b> DBT <b>Status:</b> In-progress
<b>Collaborative R&amp;D Projects (Ongoing)</b>			
4.	Isotopic and geochemical approach to study vulnerable confined and unconfined drinking water aquifers in Varanasi and surrounding area, India	Rajesh Singh (PI), R.P. Pandey BHU, Varanasi (Lead) Other Collaborators: BARC, Mumbai, ICER, Hungary	3 Years (07/21-06/24) <b>Sponsored by:</b> BHU <b>Status:</b> In-progress
5.	Comprehensive characterization of variably processed sewage sludge in Ganga basin to classify its suitability for safe disposal	VK Tyagi, (Co-PI) AA Kazmi (PI, IITR)	02 Years (01/22-06/24) <b>Sponsored by:</b> Central Pollution Control Board (CPCB)-NMCG <b>Status:</b> In-progress
6.	SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resources recovery for India	VK Tyagi, (Co-PI) AA Kazmi (PI, IITR)	4 Years (03/20-06/24) <b>Sponsored by:</b> DST <b>Status:</b> In-progress
<b>Internal Study (Ongoing)</b>			
7.	Characterisation of Groundwater Dynamics in Krishna-Godavari Delta interims using groundwater levels, Hydrochemistry, Isotopes and Emerging Contaminants	MK Sharma (PI), Suhas Khobragade, Rajesh Singh	2 Years (04/22-06/24) <b>Status:</b> In-progress
8.	Understanding arsenic mobilization in groundwater of Haridwar and formulating remediation measures	Rajesh Singh (PI), RP Pandey, Sumant Kumar, Pradeep Kumar, MK Sharma, VK Tyagi, Kalzang Chhoden	3 Years (07/21-06/24) <b>Status:</b> In-progress
9.	Simulation of Non-Point Source Pollution Processes in Song River	Pradeep Kumar (PI), MK Sharma, Rajesh Singh	4 Years (11/19-06/24) <b>Status:</b> In-progress
10.	Hydrological Studies for the Conservation of Rewalsar Lake	Kalzang Chhoden (PI) Rajesh Singh, RP Pandey, P Kumar, VK Tyagi, Omkar Singh, Suhas Khobragade, DS Malik, GKU, Haridwar	3 Years (12/22-11/25) <b>Status:</b> In-Progress
11.	Comprehensive evaluation of disinfection units of STPs in Ganga basin: Occurrence and control formation of emerging oxidation precursors	VK Tyagi (PI), Rajesh Singh, MK Sharma, P Kumar, JP Patra, Kalzang Chhoden, RP Pandey	3 Years (04/23 - 03/26) <b>Status:</b> In-Progress

<b>Internal Study (New)</b>			
12.	Nano-technology-enabled Multifunctional Materials for the Detection and Remediation of Arsenic in Contaminated Water	PK Sahoo (PI), Rajesh Singh, RP Pandey, MK Sharma, Pradeep Kumar, VK Tyagi, Sumant Kumar, Kalzang Chhoden	3 Years (04/24 - 03/27)
13.	Land and water management plan for rejuvenation of Manorama River	Shakti Suryavanshi (PI), SK Kumre, RP Pandey, Pradeep Kumar, Rajesh Singh, MK Sharma, VK Tyagi	3 Years (04/24 - 03/27)
14.	Groundwater Quality Assessment of Tripura with Special Reference to Arsenic and Fluoride	Rajesh Singh (PI), VK Tyagi, MK Sharma, PK Sahoo, Kalzang Chhoden, Shakti Suryavanshi, S.K. Sharma, Swapnali Barman, WR Singh, Rajib Paul (TSPCB)	3 Years (04/24 - 03/27)
15.	Comprehensive Hydrological Study for River Health Assessment and Development of Environmental Management Plan for River Yamuna	Pradeep Kumar (Lead-PI) and team of scientists from EHD, GWHD & HI	5 Years (04/24 - 03/29)
<b>Consultancy Projects (Ongoing)</b>			
16.	Water Quality Studies for Tehri Reservoir Tehri HPP (4x250MW)	Sudhir Kumar, RP Pandey, MK Sharma (PI), P Kumar, Rajesh Singh, SK Kumre	2 Years (02/23-01/25) <b>Funded by:</b> THDC, India Limited <b>Cost:</b> Rs. 6.91 Lakh <b>Status:</b> In-Progress
17.	Preparation of District/State Action Plans for Source Sustainability of Drinking Water Supply Schemes under Jal Jeevan Mission, Uttarakhand	RP Pandey (PI), Rajesh Singh (Co-PI), P Kumar, MK Sharma, VK Tyagi, Kalzang Chhoden, PK Sahoo, Shakti Suryavanshi, Shailendra Kumre	08 Months (10/23-06/24) <b>Funded by:</b> Uttarakhand Jal Jeevan Mission <b>Cost:</b> Rs. 1.06 Crore <b>Status:</b> In-Progress

## GROUNDWATER HYDROLOGY DIVISION

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

### Progress of Work Program for the Year 2023-24

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

<b>Internal Studies (New)</b>		
<u>Major Project with Sub-Projects from S. No. 9-12</u>	Enhancing the Sustainability of Water Resources Through Integrated Assessment and Management Techniques in the LUNI River Basin – Rajasthan	No specific comments were received from the members.
9. NIH/GWH/24-27	Hydrogeochemical Evolution and role of Paleochannels on groundwater quality in the Luni Basin	The members suggested to consider the geomorphology of the study area for understanding the recharge process and subsequent groundwater management.
10. NIH/GWH/24-26	Estimation of Soil Characteristics and Simulation of Groundwater Recharge in the Luni River Basin	Dr. S. M. Sharma raised concern over the depth of vadose zone, target zones for recharge, and different modeling techniques for recharge estimation. He suggested using an alternative word for ‘groundwater recharge’ in the title which was agreed by PI.
11. NIH/GWH/24-26	Hydrogeological Investigations in the Luni River Basin	No specific comments were received from the members
12. NIH/GWH/24-27	Characterization and Modeling of Multi Aquifer System of LUNI River Basin in Rajasthan Under Climate and Anthropogenic Influences	No specific comments were received from the members
13. NIH/GWH/24-27	Surface water - groundwater interactions through field techniques and hydrological modelling in Yamuna basin	Members suggested that Dr. Soumyaranjan Sahoo from Surface water Hydrology Division may be included in the team.

#### **Recommended Work Programme for the Year 2024-25**

<b>S. No.</b>	<b>Project</b>	<b>Project Team</b>	<b>Duration</b>	<b>Funding</b>
<b>Internal Studies (Ongoing)</b>				
NIH/GWH/22-25	Studying arsenic genesis and developing alternate water supply management strategies in Ganga basin	Sumant Kumar (PI), Surjeet Singh, Nitesh Patidar, Rajesh Singh, Gopal Krishan, M.K. Sharma, Vinay Tyagi, Soban Singh Rawat, P.K. Mishra	3 years (04/22 – 03/25) Status: <b>In-progress</b>	Internal Study
NIH/GWH/22-24	Conjunctive Management of Water Resources in IGNP Command	Nitesh Patidar (PI), M. K. Goel, Anupma Sharma, Surjeet Singh, Gopal Krishan, Sumant Kumar	2 years (04/22 – 3/24) <b>In-progress</b> ext. till May 2024	Internal Study
NIH/GWH/23-24	Development of Archive of Soil Hydraulic Characteristics	Nitesh Patidar (PI), Surjeet Singh, M.K. Goel, Anupma Sharma	1 year (04/23 – 03/24) Status: <b>In-progress</b> ext. till Sept. 2024	Internal Study
NIH/GWH/23-25	Enhancement and application of NIH_WISDOM	Nitesh Patidar (PI) Deepak Singh Bisht, M.K. Goel, T. Thomas, Sunil Gurrapu, Anupma Sharma, Surjeet Singh	2 years (10/23 – 09/25) Status: <b>In-progress</b>	Internal Study

<b>Sponsored Projects (Ongoing)</b>				
NIH/GWH/DS T/19-23	Enhancing Food and Water Security in Arid Region through Improved Understanding of Quantity, Quality and Management of Blue, Green and Grey Water	Anupma Sharma (PI-NIH), Gopal Krishan, Nitesh Patidar, P.K. Mishra (Lead: CAZRI Jodhpur, Partners: NIH, IISWC Dehradun, CSWRI & CIAH, Bikaner, NIAM Jaipur)	5 years (03/19 - 07/24)  <b>Status: In progress</b>	DST
<b>Sponsored Projects (New)</b>				
1. NIH/GWH/DST-SERB/23-25	Use of deep learning models to understand the impact of climate and land use changes on future groundwater resources, with focus on data scarce regions.	L. Surinaidu (PI-NIH) (Lead: IIT Hyderabad, Partner: McGill University, Canada)	2 years 06/23-07/25 <b>Status: New Study</b> Transferred to NIH from NGRI	DST-SERB
NIH/GWH/MoES/22-24	Carriers of Mass Transport Contamination in Delhi, NCR	L. Surinaidu (PI-NIH) (Lead: NGRI, Hyderabad)	2 years 10/22-09/24 <b>Status: New</b> Transferred from NGRI	MoES
<b>Internal Studies (New)</b>				
NIH/GWH/24-27	Surface water-groundwater interactions through field techniques and hydrological modelling in Yamuna basin	Sumant Kumar (PI), Nitesh Patidar, L. Surinaidu, Pintu Gupta, Ajit Kumar Behera, Anupma Sharma, Shailendra Kumre, Gopal Krishan	3 years (04/24 – 03/27) <b>Status: New Study</b>	Internal Study
<u>Major Project with sub-projects (S.N. 2-5)</u>	Enhancing Sustainability of Water Resources Through Integrated Assessment and Management Techniques in the LUNI River Basin – Rajasthan	Anupma Sharma (Project Coordinator) Scientists from GWH Div. & NWRC Jodhpur	3 years (04/24 – 03/27) <b>Status: New Study</b>	Internal Study
NIH/GWH / 24-26	Estimation of Soil Characteristics and Simulation of Groundwater Recharge in the Luni River Basin	Satendra Kumar (PI) Anupma Sharma, L. Surinaidu, Ajit K. Behera, Pintu K. Gupta, Nitesh Patidar	2 years (04/24 – 03/26) <b>Status: New Study</b>	Internal Study
NIH/GWH/24-27	Hydrogeochemical Evolution and role of Paleochannels on groundwater quality in the Luni Basin	Ajit Kumar Behera (PI), L. Surinaidu, Pintu Gupta, Malkhan Singh Jatav, Anupma Sharma, M. K. Sharma, Dr. A. H. Laskar (PRL)	3 years (04/24 – 03/27) <b>Status: New Study</b>	Internal Study
NIH/GWH/24-26	Hydrogeological Investigations in the Luni River Basin	Pintu Kumar Gupta (PI), L. Surinaidu, Nitesh Patidar, Ajit Kumar Behera, Satendra Kumar, Sudesh Chaudhary	2 years (04/24 – 03/26) <b>Status: New Study</b>	Internal Study
NIH/GWH/24-27	Characterization and Modeling of Multi Aquifer System of Luni River Basin in Rajasthan Under Climate and Anthropogenic Influences	L. Surinaidu (PI), Anupma Sharma, Ajit K. Behera Sumant Kumar, Sudesh Chaudhary	3 years (04/24 – 03/27) <b>Status: New Study</b>	Internal Study

## HYDROLOGICAL INVESTIGATIONS DIVISION

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

### Progress of Work Program for the Year 2023-24

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

9.	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	Not presented
<b>Proposed New Studies for 2024-25</b>		
1.	Development of radiocarbon dating facility	Dr. Bhishm Kumar suggested that Benzene line may also be prepared to explore groundwater age dating up to 50k yrs.
2.	Understanding Surface Water Groundwater Interactions in the Narmada River Basin and its Hydrological Implications	Chairman, WG suggested to discuss the study with NCA and Bhopal RC. Dr Bhishm Kumar suggested to include the Bhopal regional center and the state groundwater department in this study. Sh. Sudhindra Mohan Sharma suggested to carry out this study with more focus on factors controlling the base flow in the Narmada River basin.
3.	Hydrological and hydrogeological investigations in the Yamuna river basin using isotope techniques	No specific comments/suggestions.
4.	Fingerprinting of aquifer dynamics in India through isotopic and geochemical approach: demand driven investigations at regional scale under NAQUIM 2.0	No specific comments/suggestions.
5.	Quantifying Current and Future Meteorological Drought Characteristics and Identifying Risk Zones in Central India	Chairman, WG suggested to carry out the study for Uttar Pradesh region of Yamuna basin also. He also suggested to add an expert from Bhopal RC in the study Dr. Surjeet Singh, Sc-G and Head C4S, suggested to look into the work already done by Bhopal RC Dr. Grewal suggested to review the work done by various agricultural universities and other departments of the state

**Recommended Work Programme for the Year 2024-25**

S. No.	Project Title	Study Team	Duration	Status
<b>INTERNAL STUDIES</b>				
1.	Assessment of the Possible Impact of Climate Change on Evapotranspiration for Different Climatic Regions of India	SD Khobragade (PI), Vishal Singh	3 years (04/22-03/25)	On-going
2.	Runoff and Water Storage Capacity Estimation for Deciding Rainwater Harvesting Strategies	Dr. S.M. Pingale(PI) Dr. Soban Singh Rawat, Dr. S. D. Khobragade Sh. Rajeev Gupta	2 Years (04/23-03/25)	On-going
3.	Sedimentation and Water Quality Study of Fulhar Lake, Pilibhit (U.P.)	Sh. Rajeev Gupta (PI), Dr. S.D. Khobragade Dr. S.M. Pingale	2 Years (04/23-03/25)	On-going
4.	Development of radiocarbon dating facility	Dr. Tripti Muguli (PI) Dr. Someshwar Rao, Dr. Amit Pandey	1 year (04/24-04/25)	<b>New Study</b>



S. No.	Project Title	Study Team	Duration	Status
5.	Understanding Surface Water Groundwater Interactions in the Narmada River Basin and its Hydrological Implications	Dr. Amit Pandey (PI) Dr. S. D. Khobragade, Dr. Someshwar Rao Dr. Tripti Muguli	3 years (04/24-03/27)	New Study
6	Hydrological and hydrogeological investigations in the Yamuna River basin using isotope techniques.	Dr. Tripti Muguli (Project Coordinator), Dr. Suhas Khobragade, Dr. Someshwar Rao Sh. Ruchir Patidar, Sh. Vipin Agrawal, Dr. Amit Pandey	3 years (04/24-03/27)	New Study
7	Fingerprinting of aquifer dynamics in India through isotopic and geochemical approach: demand driven investigations at regional scale under NAQUIM 2.0	Dr. Tripti Muguli (PI), Dr. S.D. Khobragade	3 years (04/24-03/27)	New Study
8.	Quantifying Current and Future Meteorological Drought Characteristics and Identifying Risk Zones in Central India.	Sh. Ruchir Patidar (PI), Dr. S.M. Pingale, Dr. S.D. Khobragade	3 years (04/24-03/27)	New Study
<b>SPONSORED PROJECTS</b>				
1.	Groundwater Fluctuations and Conductivity Monitoring in Punjab - Groundwater resilience in Punjab and adaptation to future changes in climate and water resource demands (title modified by funding agency)	Dr. Gopal Krishan (PI), Dr. S. Singh, Dr. M. S. Rao <i>BGS, UK:</i> Dr. Dan Lapworth Dr. Alan MacDonald Dr. Daren Goody	7 years (12/17-11/24)	On-going
2.	Expansion of the Indo-German Competence Centre for Riverbank Filtration – CCRBF	Dr. Gopal Krishan (PI & Co-coordinator) Federal Min. of Education and Research, Germany	(07/20 – 03/24) (likely to be extended further)	On-going
3.	Partitioning Evapotranspiration into Evaporation and Transpiration fluxes using Stable Isotopes of Oxygen and Hydrogen	Dr. Gopal Krishan (PI), Dr. MS Rao DST-SERB	04/21 – 03/24 (likely to be extended up to 10/2024)	On-going
4.	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	Dr. M. K. Sharma (PI) Ms. Anjali Dr. Vishal Singh Dr. SM Pingale, Dr. S.D. Khobragade Dr. Pradeep Kumar, Dr. Nitesh Patidar, Dr. Surjeet Singh.	5 years (04/22-03/27)	On-going

## SURFACE WATER HYDROLOGY DIVISION

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

### Progress of Work Program for the Year 2023-24

S. No.	Title of Project/Study	Recommendations/Suggestions
<b>Internal Studies (Completed)</b>		
1.	Development of Cloud Data Based Integrated Framework to Forecast Flood for Efficient Operation of Reservoirs	Completed. No specific action suggested.
2.	Hydraulic force-inversion equation for exact modeling of hydraulic jumps in rectangular channels	Completed. There were no specific comments from the members on the study.
<b>Internal Studies (Ongoing)</b>		
1.	Flood Forecasting under Changing Climate Conditions - Role of Machine Learning and Conceptual/Physical based Model	No specific action was suggested.
2.	Hydrological Study for revival and restoration of traditional water bodies in Bikaner, Rajasthan	No specific action was suggested.
3.	Review of design flood and dam break analysis of Khadakhai Dam in Odisha	No specific action was suggested.
4.	Investigation on occurrences of seasonal extremes across Northwest Himalaya in relation to global atmospheric thermal and circulation changes	Transferred to C4S.
5.	Investigating gap areas, current trends and future directions of research in Climate Change Impact on Hydrology and Water Resources in India through Scientometrics.	Transferred to WRSD.
6.	Investigation of hydrodynamic approach of flood inundation mapping along with assessment of changes in river planforms using a cloud-based Google Earth Engine (GEE) computing platform in data-scarce Western Himalayan River basin	No specific action was suggested.
7.	Estimation of confidence intervals of index flow duration curves	No specific action was suggested.
8.	Hydrologic and hydraulic study for Jata Ganga river at Jageshwar dham	No specific action was suggested.
<b>Sponsored Projects (Ongoing)</b>		
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	The study was presented by PI. There were no specific comments from the members on the study.
<b>Internal studies (New)</b>		
1.	Entropy and Image Processing Based Non-Contact Discharge Monitoring Techniques: Testing and Implementation for Indian rivers	PI presented the objectives and scope of the proposed study. There were no specific suggestions/comments from the members.
2.	A Flood Forecasting Framework Coupling a High Resolution WRF Ensemble with 2D Hydrodynamics Model for Himalayan Mountainous Area.	PI presented the objectives and scope of the proposed study. There were no specific suggestions/comments from the members.
3.	Basin-scale, integrated water resources assessment through integrated hydrological modelling	PI presented the objectives and deliverables of the proposed study. Suggestion from Dr. Praveen K. Thakur (member WG) were to include: i) Soil

		moisture data from Bhoonidhi; ii) An objective on satellite data assimilation.
4.	Comprehensive Mapping of Water Budget Dynamics and Reservoir Sedimentation in the Upper Krishna Basin using Google Earth Engine.	PI presented the objectives and deliverables of the proposed study. Dr. Praveen Thakur suggested to include SWOT mission data in the present study.
5.	Water Resources Planning and Management using DSS (PM) under Changing Climatic and Land-Use Conditions	PI presented the objectives and deliverables of the proposed study. Dr. Praveen Thakur suggested to include Cartosat data for DEM generation.
6.	Web based platform for IDF Design Rainfall Estimates for India	PI presented the objectives and deliverables of the proposed study. Dr. Praveen Thakur suggested to use the word 'curve' instead of 'depth' and to incorporate PMP Atlas data in database.

**Recommended Work Programme for the Year 2024-25**

S. No.	Title of Project/Study	Study Team	Duration	Funding
<b>Internal studies (Ongoing)</b>				
1.	Flood Forecasting under Changing Climate Conditions - Role of Machine Learning and Conceptual/Physical based Model	P. C. Nayak; A. K. Lohani; J. P. Patra; Sunil Gurrapu; T. Thomas; Om Prakash; Jatin Malhotra	03 Year (July 2022 - June 2025)	NIH
2.	Hydrological Study for revival and restoration of traditional water bodies in Bikaner, Rajasthan	L. N. Thakural; J. P. Patra; M. K. Sharma; R. K. Jaiswal; P. K. Mishra; Nitesh Patidar; N. K. Bhatnagar; Jatin Malhotra; Anil Kumar Chhangani	02 Year (Apr 2022 - June 2024) (Extension required for Six months)	NIH
3.	Review of design flood and dam break analysis of Khadakhai Dam in Odisha	J.P. Patra; A. K. Lohani; Pankaj Mani; P. C. Nayak Sanjay Kumar	03 Year (April 2022 - March 2025)	NIH
4.	Investigation of hydrodynamic approach of flood inundation mapping along with assessment of changes in river planforms using a cloud-based Google Earth Engine (GEE) computing platform in data-scarce Western Himalayan River basin	R. V. Kale; A. K. Lohani J. P. Patra; D. Khurana	03 Years (September 2021- October 2024)	NIH
5.	Estimation of confidence intervals of index flow duration curves	Sanjay Kumar; Sunil Gurrapu; L. N. Thakural J. P Patra	02 Years (April 2023 - March 2025)	NIH
6.	Hydrologic and hydraulic study for Jata Ganga river at Jageshwar dham	J.P. Patra; A. K. Lohani; Pankaj Mani; D. S Bisht; S. S. Rawat	01 Years (July 2023 - July 2024)	NIH
<b>Sponsored Projects (Ongoing)</b>				
1.	Operational coastal flood management through short-to-medium range (real-time) flood vulnerability mapping in the Brahmani-Baitarani River Basin integrating human and climate induced impacts	B. Sahoo (PI, IIT-Kgp), R. V. Kale, (Co-PI)	04 years (July, 2020 – June, 2024)	STARS (MHRD, GoI)
<b>Internal studies (proposed)</b>				
1.	Entropy and Image Processing Based Non-Contact Discharge Monitoring Techniques: Testing and Implementation for Indian rivers	NIH: R, V, Kale; M. K. Goel; A. K. Lohani CWPRS: Dr. Selva Balan External Expert: Prof. M. Perumal	1.5 Years (April 2024 - September 2025)	NIH

2.	A Flood Forecasting Framework Coupling a High Resolution WRF Ensemble with 2D Hydrodynamics Model for Himalayan Mountainous Area.	R. V. Kale; K. Sharma; S. Kumar; A. K. Lohani	03 Year (April 2024 - March 2027)	NIH
3.	Basin-scale, integrated water resources assessment through integrated hydrological modelling.	S. Sahoo; A. K, Lohani; P. C. Nayak; R. V. Kale; J. P. Patra	2.5 Years (April 2024 - September 2026)	NIH
4.	Comprehensive Mapping of Water Budget Dynamics and Reservoir Sedimentation in the Upper Krishna Basin using Google Earth Engine.	Chandra Prakash; A. K. Lohani; R. V. Kale; Richa Pandey	02 Years (April 2024 - March 2026)	NIH
5.	Water Resources Planning and Management using DSS (PM) under Changing Climatic and Land-Use Conditions	Richa Pandey, Chandra Prakash, Sukant Jain, J. P. Patra, R. K. Jaiswal, A. K. Lohani	02 Years (April 2024 - March 2026)	NIH
6.	Web based platform for IDF Design Rainfall Estimates for India	Sukant Jain; A. K. Lohani; J. P. Patra; Richa Pandey; Chandra Prakash	1.5 Years (April 2024 - September 2025)	NIH

## WATER RESOURCES SYSTEMS DIVISION

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

### Progress of Work Program for the Year 2023-24

S. No.	Title of Project/Study	Recommendations/ Suggestions
<b>Ongoing Sponsored/ Internal Studies</b>		
1.	Snow and glacier contribution and impact of climate change in Teesta river basin in Eastern Himalaya <b>Team:</b> P K Singh; Vishal Singh; A K Lohani <b>Duration:</b> 3 years (11/19-11/22), Extended up to 03/24 <b>Funding:</b> NMHS-MoEF (143)	Not presented due to time constraints as they are the sponsored research projects
2.	Development of Water Accounts for the different sub-basins of Brahmaputra and Barak River Basins in the state of Meghalaya Using Water Accounting Plus (WA+) Framework. <b>Team:</b> P K Singh; P K Mishra <b>Duration:</b> 2 years (08/20-07/22), Extended up to 03/24 <b>Funding:</b> NHP (14.50)	Not presented due to time constraints as they are the sponsored research projects
3.	Monitoring and hydrological modeling of Henva watershed in Lesser Himalaya <b>Team:</b> M K Nema; P K Mishra <b>Duration:</b> 3.5 years (08/20-03/24) <b>Funding:</b> NIH (10.22)	Not presented due to time constraints
4.	Development of Water Accounts for the selected sub-basins of Brahmaputra, Barak and Irrawady-Chindwin basins in the state of Nagaland using Water Accounting Plus (WA+) Framework. <b>Team:</b> P K Mishra; P K Singh <b>Duration:</b> 2 years (04/21-06/23), Extended up to 03/24 <b>Funding:</b> NHP (9.00)	Not presented due to time constraints as they are the sponsored research projects
5.	Hydrological Assessment of Ungauged Basins (Aghanashini, Dasanakatte, Sita Nadi, Madisala Hole, Swarna Nadi and Gurupur River Basins) of the West Flowing Rivers in the Western Ghat Region of Karnataka <b>Team:</b> P K Singh; Vishal Singh; Harsh Upadhyay; Abhilash R. <b>Duration:</b> 3 years (04/22-03/25) <b>Funding:</b> NHP (54.0)	Dr. P K Singh presented the progress of the study. No specific comments/suggestions were received.
6.	Spatio-temporal Water Availability under Changing Climate and Land-use Scenarios in Wainganga River Basin <b>Team:</b> M K Nema; P K Mishra <b>Duration:</b> 3 years (04/22-03/25) <b>Funding:</b> NIH (9.72)	Dr. M K Nema presented the progress of the study and informed that various Hydro-met, future climatic and other related data have been collected and preliminary analysis have been done. The SWAT model has also been set-up for the basin and further fine tuning is in progress. Dr. Nema also asked for an extension of one more year in order to complete all-study objectives, which has been approved by the WG.

7.	Investigating gap areas, current trends and future directions of research in Climate Change Impact on Hydrology and water Resources in India through Scientometrics <b>Team:</b> Archana Sarkar; Jyoti Patil; Charu Pandey <b>Duration:</b> 2 years (05/22-04/24) <b>Funding:</b> NIH	Dr. Archana Sarkar presented the background, objectives, methodology, details of analysis & results of the study. She emphasized that scientometric analysis are very important for finding out the research growth in any particular domain and such analysis should be carried out before taking up any study. Dr. Sudhindra Sharma and Dr. Praveen Thakur, members of working group appreciated the work.
8.	Monitoring and Assessment of Mountain Ecosystem and Services in North-West Himalaya (Phase-II): Monitoring and Modeling of Hydrological Processes in Glaciated and Non-Glaciated Watersheds of North-West Himalaya <b>Team:</b> M K Nema; P. K. Mishra; Praveen Thakur (IIRS) <b>Duration:</b> 3 years (04/22-03/25) <b>Funding:</b> IIRS (30.91)	Not presented due to time constraints as they are the sponsored research projects
<b>New Internal/ Sponsored Studies</b>		
1.	Simulation of operation of multiple reservoirs in Wainganga Basin for conservation and flood control under changing climate scenario <b>Team:</b> A R Senthil Kumar; T Thomas; M K Nema; Harsh Upadhyay; Sunil Gurrapu <b>Duration:</b> 3 years (04/24-03/27) <b>Funding:</b> NIH (21.02)	Dr. A R Senthil Kumar presented the proposed new study. The WG member, Dr. Bhishm Kumar inquired about the requirement of the study from the project authority and suggested to include the relevant personnel from WRD, Maharashtra/ Madhya Pradesh. Dr. Nema informed the requirement of the study as per the earlier discussion with the project authority. The Chairman suggested to replicate this type of study in Yamuna Basin at a later stage.
2.	ResSed – Tool development for prediction of elevation-area-capacity curves of the reservoirs <b>Team:</b> A R Senthil Kumar; U K Singh; P K Singh; Harsh Upadhyay; Nitesh Patidar <b>Duration:</b> 2 years (04/24-03/26) <b>Funding:</b> NIH (11.18)	Dr. A R Senthil Kumar presented the proposed new study. No specific comments/suggestions were received.
3.	Integrated operation of Bisalpur and Isarda reservoirs in Banas river basin, Rajasthan <b>Team:</b> Archana Sarkar; A R Senthil Kumar; P K Mishra; Harsh Upadhyay; Mr. Sanjay Agarwal <b>Duration:</b> 3 years (04/24-03/27) <b>Funding:</b> NIH (19.30)	Dr. Archana Sarkar presented the new study. She informed that the development of rule curve based integrated operational framework for existing Bisalpur dam and under construction Isarda dam is important to ensure reliable releases from the reservoirs for conservation purposes considering forecasted inflow and sediment yield.
4.	Water and Land Productivity Accounts for the major river basins of India using water accounting plus for sustaining water and food security: WAPRO-India <b>Team:</b> P K Singh; P K Mishra; Vishal Singh; Harsh Upadhyay; P R Patil; A. R. Senthil Kumar <b>Duration:</b> 2 years (04/24-03/26) <b>Funding:</b> NIH (43.48)	Dr. P K Singh presented the proposed new study. The WG suggested to remove objective number 04 and also advised to drop "...for sustaining water and food security" from the title of the project.

5.	Development of rule-based integrated operation framework for the Mahanadi basin. <b>Team:</b> P K Mishra; M K Goel; P K Singh; A R Senthil Kumar <b>Duration:</b> 1.5 years (04/24-09/25) <b>Funding:</b> NIH (5.0)	Dr. P K Singh presented the proposed new study and no specific comments/suggestions were received.
6.	Assessment of Precipitation Gradients and Temperature Lapse Rates for Hydrological Modelling in a Himalayan Catchment <b>Team:</b> P R Patil; M K Nema; P K Mishra; A R Senthil Kumar; Asif <b>Duration:</b> 3 years (04/24-03/27) <b>Funding:</b> NIH (20.0)	Dr. P R Patil presented the proposed study. Chairman suggested to remove the first objective of study. Dr. Nema informed that flow data will be recorded by installing a flow measuring device at outlet of Henva River under ongoing IIRS-DoS sponsored project Mr. Asif, RA, WRSD will also assist in this study.
7.	Evaluation of Area-Design Curve to estimate sediment distribution in Indian reservoirs <b>Team:</b> U K Singh; A R Senthil Kumar; M K Goel; P R Patil <b>Duration:</b> 2 years (04/24-03/26) <b>Funding:</b> NIH (1.0)	Dr. U K Singh presented the proposed new study and no specific comments/ suggestions were received.
8.	Water yield potential and flash flood risk assessment under changing climate and land use and strengthening of existing instrumentation in the Teesta River basin up to Domohani. <b>Team:</b> Harsh Upadhyay; P K Singh; A R Senthil Kumar; P R Patil <b>Duration:</b> 3 years (04/24-03/27) <b>Funding:</b> NIH (44.52)	Er. Harsh Upadhyay presented the proposed new study. The Chairman suggested to remove the first two objectives of the study. Further, the WG member Dr. Praveen Thakur (IIRS) suggested to add GLOF component in the study.

### Recommended Work Programme for the Year 2024-25

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

8.	Monitoring and Assessment of Mountain Ecosystem and Services in North-West Himalaya (Phase-II): Monitoring and Modeling of Hydrological Processes in Glaciated and Non-Glaciated Watersheds of North-West Himalaya	M K Nema; P. K. Mishra; P. R. Patil; Praveen Thakur (IIRS)	3 years (04/22-03/25)	IIRS
<b>New Internal/ Sponsored Studies</b>				
1.	Simulation of operation of multiple reservoirs in Wainganga Basin for conservation and flood control under changing climate scenario	A R Senthil Kumar; T Thomas; M K Nema; Harsh Upadhyay; Sunil Gurrapu	3 years (04/24-03/27)	NIH
2.	ResSed – Tool development for prediction of elevation-area-capacity curves of the reservoirs	A R Senthil Kumar; U K Singh; P. R. Patil; Harsh Upadhyay; Nitesh Patidar	2 years (04/24-03/26)	NIH
3.	Integrated operation of Bisalpur and Isarda reservoirs in Banas river basin, Rajasthan	Archana Sarkar; A R Senthil Kumar; P K Mishra; Harsh Upadhyay; Sanjay Agarwal	3 years (04/24-03/27)	NIH
4.	Water and Land Productivity Accounts for the major river basins of India using water accounting plus: WAPRO-India	P K Mishra; P K Singh; Vishal Singh; Harsh Upadhyay; P R Patil; A. R. Senthil kumar	2 years (04/24-03/26)	NIH
5.	Development of rule-based integrated operation framework for the Mahanadi basin	P K Mishra; M K Goel; A R Senthil Kumar, Harsh Upadhyay	1.5 years (04/24-09/25)	NIH
6.	Assessment of Precipitation Gradients and Temperature Lapse Rates for Hydrological Modelling in a Himalayan Catchment	P R Patil; M K Nema; P K Mishra; A R Senthil Kumar; Asif	3 years (04/24-03/27)	NIH
7.	Evaluation of Area-Design Curve to estimate sediment distribution in Indian reservoirs	U K Singh; A R Senthil Kumar; M K Goel; P R Patil	2 years (04/24-03/26)	NIH
8.	Water yield potential and flash flood risk assessment under changing climate and land use and strengthening of existing instrumentation in the Teesta River basin up to Domohani	Harsh Upadhyay; Vishal Singh; P K Singh; A R Senthil Kumar; P R Patil	3 years (04/24-03/27)	NIH

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

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List of Working Group Members who attended the 54<sup>th</sup> WG meeting

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

## Scientists of NIH:

	<b>C4S Division</b>		<b>HI Division</b>
1.	Dr. Surjeet Singh, Sc.G	24.	Dr. M S Rao, Sc.G
2.	Dr. Soban Singh Rawat, Sc.F	25.	Dr. Gopal Krishan, Sc.E
3.	Dr.(Smt) Ashwini A. Ranade, Sc.D	26.	Dr. Santosh M. Pingale, Sc.D
4.	Dr. Sunil Gurrapu, Sc.D	27.	Dr. Tripti Muguli, Sc.D
5.	Dr. Vishal Singh, Sc.D	28.	Sri. Rajeev Gupta, Sc.B
6.	Dr. Lavkush Kumar Patel, Sc.D	29.	Sri. Ruchir Patidar, Sc.B
7.	Dr. Deepak Singh Bisht, Sc.C	30.	Sri V K Agarwal, Sc.B
8.	Dr. Akshaya Verma, Sc.C	31.	Dr. Amit Pandey, Sc.B
9.	Dr. Kuldeep Sharma, Sc.C		<b>SWH Division</b>
10.	Sri. Rajat Kumar, Sc.B	32.	Dr. S K Singh, Sc.F
	<b>EH Division</b>	33.	Dr. P C Nayak, Sc.F
11.	Dr. M K Sharma, Sc.F	34.	Dr. Sanjay Kumar, Sc.F
12.	Dr. Rajesh Singh, Sc.E	35.	Dr. Ravindra Vitthal Kale, Sc.E
13.	Dr. Pradeep Kumar, Sc.E	36.	Dr. L N Thakural, Sc.E
14.	Dr. Vinay Kumar Tyagi, Sc.D	37.	Er. J P Patra, Sc.E
15.	Dr. Prasanta Kumar Sahoo, Sc.D	38.	Sri. Om Prakash, Sc.B
16.	Dr. Shakti Suryavanshi, Sc.C	39.	Dr. Soumyaranjan Sahoo, Sc.B
17.	Dr. Shailendra Kumar Kumre, Sc.B	40.	Dr. Richa Pandey, Sc.B
	<b>GWH Division</b>	41.	Sri. Chandra Prakash, Sc.B
18.	Dr. Sumant Kumar, Sc.E		<b>WRS Division</b>
19.	Dr. Lagudu Surinaidu, Sc.D	42.	Dr. Archana Sarkar, Sc.,F
20.	Dr. Nitesh Patidar, Sc.C	43.	Dr. P K Singh, Sc.E
21.	Dr. Ajit Kumar Behera, Sc.C	44.	Dr. Manish K. Nema, Sc.E
22.	Dr. Satendra Kumar, Sc.B	45.	Dr. P K Mishra, Sc.D
23.	Sri. Pintu Kumar Gupta, Sc.B	46.	Dr. Pravin Rangrao Patil, Sc.C
		47.	Dr. Umesh Kumar Singh, Sc.C
		48.	Sri. Harsh Upadhyay, Sc.B

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

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