

## NATIONAL INSTITUTE OF HYDROLOGY, ROORKEE

### Minutes of the 53<sup>rd</sup> Meeting of NIH Working Group (16-17 March, 2023)

The 53<sup>rd</sup> meeting of NIH working group was held during 16-17 March, 2023 at Roorkee under the Chairmanship of Dr. Sudhir Kumar, Director (NIH). A list of participants of the meeting is given in Annexure-I.

#### ITEM NO. 53.1: 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 2022-23 and to formulate the work program of 2023-24. 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.N.	Member	Suggestion(s)
1.	Prof. A.P. Dimri	<ul style="list-style-type: none"><li>▪ To explore applicability of Geomatics &amp; GNSS in various studies</li><li>▪ Try to prepare basin level atlas</li><li>▪ Suggestion for supervision of doctorate and Master Level Courses by Scientists and initiation of 2 week master student's program in the domain of hydrology and water resources</li></ul>
2.	Dr. Bishm Kumar	<ul style="list-style-type: none"><li>▪ Develop a database and share it in the public domain</li><li>▪ Burning issues related to water should be emphasized while designing any research proposal</li><li>▪ R&amp;D dissemination for Society</li></ul>
3.	Dr. Manoj P. Samuel	<ul style="list-style-type: none"><li>▪ Research should be executed in the interest of society and suggestion to develop Models/Mobile Apps for common people.</li><li>▪ Need of Commercial Wing for Business development related to water sector R&amp;D activities</li><li>▪ Suggested collaboration of new NIH-RC, Jodhpur with CAZRI (Jodhpur) in R&amp;D and other activities</li><li>▪ Suggestion for data base and data sharing</li></ul>
4.	Prof. Ramakar Jha	<ul style="list-style-type: none"><li>▪ While doing research, drone technology may be used in inaccessible areas</li><li>▪ Make efforts to patent the software developed by the Institute</li><li>▪ Re-employment of retired scientists in NIH to utilize their rich experience/knowledge for Institute's R&amp;D activities</li></ul>
5.	Dr. Vijay Kumar	<ul style="list-style-type: none"><li>▪ Suggested for collaborative work with MOES in the area of Cryosphere/Glacier Studies as well as to increase collaboration with Intl. organizations.</li><li>▪ Creation and management of data base for further collaborative studies</li></ul>
6.	Sh. Sudhindra Mohan Sharma	<ul style="list-style-type: none"><li>▪ Suggestion for public centric R&amp;D, develop public relations and translation of benefits to society and states</li><li>▪ Works for enhancing drinking water security as per mandate of the Ministry</li></ul>
7.	Dr. (Mrs.) Sadhana Malhotra	<ul style="list-style-type: none"><li>▪ Very enriching experience in NIH</li><li>▪ Dissemination of R&amp;D Output/Press release of NIH Studies</li><li>▪ To assess impact of training programs</li></ul>
8.	Prof. K.K. Singh	<ul style="list-style-type: none"><li>▪ Data repository and sharing</li><li>▪ Separate Cell for Software Development in NIH</li><li>▪ Engagement of retired scientists</li><li>▪ Research for the common man</li><li>▪ Suggestion for B. Tech/M. Tech. Internship Programs</li><li>▪ Need to rename WRS Division</li></ul>
9.	Prof. AK Saraf	<ul style="list-style-type: none"><li>▪ Appreciation for new NIH centre at Jodhpur</li><li>▪ Re-employment of NIH Scientists</li></ul>
10.	Dr. Prashant Rai	<ul style="list-style-type: none"><li>▪ Suggested more collaboration with CGWB in studies and to work in agricultural areas</li></ul>

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

**ITEM No. 53.2: CONFIRMATION OF MINUTES OF 52<sup>nd</sup> MEETING OF WORKING GROUP**

The 52<sup>nd</sup> meeting of the Working group was held during 12-13 April, 2022. The minutes of the meeting were circulated to all the members and invitees vide letter No. **RMOD/WG/NIH-10 dated 25<sup>th</sup> May, 2022**. The members confirmed the minutes of the 52<sup>nd</sup> Working Group meeting.

**ITEM No. 53.3: ACTION TAKEN ON THE DECISIONS/RECOMMENDATIONS OF THE PREVIOUS WORKING GROUP MEETING**

Er. Omkar Singh, Scientist G & Head (RMOD)/Member Secretary (WG) gave a brief account of the actions taken on the recommendations/ decisions of the 52<sup>nd</sup> working group meeting.

**ITEM Nos. 53.4 & 53.5: PRESENTATION AND DISCUSSION ON THE STATUS AND PROGRESS OF THE WORK PROGRAMME FOR YEAR 2022-23 AND FINALIZATION OF THE WORK PROGRAMME FOR YEAR 2023-24**

The Member-Secretary requested the respective Divisional Heads to present the progress of studies carried out during 2022-23 and also to present the proposed studies for F.Y. 2023-24. Accordingly, the progress of various studies and sponsored projects, and proposal for new studies and projects during 2023-24, were presented by all Scientific Divisions during the two-day deliberations of the Working Group. The Division wise minutes of each study/project presented during the meeting are given below:

**ENVIRONMENTAL HYDROLOGY DIVISION**

The overview of the technical activities of Environmental Hydrology Division (EHD) was presented by Dr. R.P. Pandey, 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 2022-23**

S. N.	Title of Project/Study	Recommendations/Comments
<b>Internal Studies (Ongoing)</b>		
1.	Characterisation of Groundwater Dynamics in Krishna-Godavari Delta interims using groundwater levels, Hydrochemistry, Isotopes and Emerging Contaminants	Dr. Bhishm Kumar suggested to involve state groundwater department in the study. Dr. Sharma noted for compliance.
2.	Understanding Arsenic mobilization in groundwater of Haridwar and formulating remediation measures	Dr. Bhishm Kumar (Ex. Scientist, NIH) suggested to correlate the Arsenic (As) in the GW with other relevant parameters. Dr. Sudhir Kumar, Director (NIH) suggested to collect and analyze sediments samples for trace metals particularly, Arsenic in Solani river.
3	Simulation of Non-Point Source Pollution Processes in Song River	There were no specific comments/suggestions.
<b>Sponsored Projects (Ongoing)</b>		
1.	Water Efficient Irrigation by Using SCADA System for Medium Irrigation Project (MIP) Shahnehar	PI has reported that further extension would be required from NHP to complete field observations.

2.	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	Dr. Bhisim Kumar (Ex. Scientist, NIH) and other working group members suggested to look after the economic benefits of the work.
<b>Sponsored /Collaborative Projects (Ongoing)</b>		
1.	SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resources recovery for India	PI reported that the study is in progress.
2.	Isotopic and geochemical approach to study vulnerable confined and unconfined drinking water aquifers in Varanasi and surrounding area, India	PI reported that this study is in progress in collaboration with other institutions
3.	Comprehensive characterization of variably processed sewage sludge in Ganga basin to classify its suitability for safe disposal	Co-PI reported that this study is in progress with IIT Roorkee
<b>Internal Studies (New)</b>		
1.	Hydrological Studies for the Conservation of Rewalsar Lake, H.P.	The queries raised by Prof. A. K. Saraf and Prof. Ramakar Jha related to methodology/data availability were replied by the PI. The WG agreed the objectives and scope of the study.
2.	Comprehensive evaluation of disinfection units of STPs in Ganga basin: Formation & Control of emerging oxidation precursors.	The WG appreciated the novelty of work to be taken up in this study. The WG agreed the objectives and scope of the study.

### **Recommended Work Programme for the Year 2023-24**

S. N.	Title of Project/Study	Study Team	Duration	Funding (Rs. Lakh)
<b>Internal Studies (Ongoing)</b>				
1.	Characterisation of Groundwater Dynamics in Krishna-Godavari Delta interims using groundwater levels, Hydrochemistry, Isotopes and Emerging Contaminants	Dr. M. K. Sharma, Sc. F (PI) Dr. Suhas Khobragade, Sc. 'G' Dr. Rajesh Singh, Sc. 'D' RC Kakinada: Dr. YRS Rao, Sc.G CGWB-Hyderabad	2 Years (04/22-03-24)	NIH
2.	Understanding Arsenic mobilization in groundwater of Haridwar and formulating remediation measures	Dr. Rajesh Singh, Sc. D (PI); Dr. R. P. Pandey, Sc. G; Dr. Sumant Kumar, Sc. D; Dr. Pradeep Kumar, Sc. D; Dr. M. K. Sharma, Sc. F; Dr. V. K. Tyagi, Sc. D; Dr. Kalzang Chhoden, Sc. C	3 Years (07/21-06/24)	NIH
3.	Simulation of Non-Point Source Pollution Processes in Song River	Dr. Pradeep Kumar, Sc. D (PI) Dr. M.K. Sharma, Sc. F Dr. Rajesh Singh, Sc. D	4 Years (11/19-10/23)	NIH
<b>Internal Studies (New)</b>				
4.	Hydrological Studies for the Conservation of Rewalsar Lake (H.P.)	Dr. Kalzang Chhoden, Sc. C, (PI); Dr. Rajesh Singh, Sc. D; Dr. R. P. Pandey, Sc. G; Dr. Pradeep Kumar, Sc. D; Dr. Vinay Kumar Tyagi, Sc. D; Er. Omkar Singh, Sc. G; Dr. Shuhas Khobragade, Sc. G; Dr. D.S. Malik, Professor, GKU, Haridwar	3 Years (04/23-03/26)	NIH
5.	Comprehensive evaluation of disinfection units of STPs in Ganga basin: Occurrence and	Dr. Vinay Kumar Tyagi, Sc. D (PI); Dr. Rajesh Singh, Sc. D; Dr. Mukesh K. Sharma, Sc. F	3 Years (04/23-03/26)	NIH

	control the formation of emerging oxidation precursors	Dr. Pradeep Kumar, Sc. D; Er. J. P. Patra, Sc. D; Dr. Kalzang Chhoden, Sc. C; Dr. R.P.Pandey, Sc. G		
<b>Sponsored Projects (Ongoing)</b>				
1.	Water Efficient Irrigation by Using SCADA System For Medium Irrigation Project (MIP) Shahnehar	Dr. R. P. Pandey, (PI) Er. J. P. Patra, Dr. Rajesh Singh Sh. N. K. Bhatnagar	3 Years (12/17-05/23). Further extension is needed to complete field based tasks	NHP (75.00)
2.	Anaerobic Co-digestion of Thermochemically Pretreated Organic Fraction of Municipal Solid Waste and Sewage Sludge: Effect on Process Performance and Microbial Community Development	Dr. Vinay Kumar Tyagi, Sc, 'D' (PI)	5 Years (2018-2023)	DBT (106.00)
<b>Collaborative Projects (Ongoing)</b>				
1.	Isotopic and geochemical approach to study vulnerable confined and unconfined drinking water aquifers in Varanasi and surrounding area, India	Dr. Rajesh Singh (PI) Dr. R.P. Pandey BHU, Varanasi (Lead) Other Collaborators: BARC, Mumbai, ICER, Hungary	3 Years (07/21-06/24)	BHU
2.	Comprehensive characterization of variably processed sewage sludge in Ganga basin to classify its suitability for safe disposal	Dr. Vinay Kumar Tyagi, Sc, 'D' (Co-PI) Dr. A.A.Kazmi (PI, IITR)	02 Years (01/22-12/23)	CPCB-NMCG
3.	SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resources recovery for India	Dr. Vinay Kumar Tyagi, Sc, 'D' (Co-PI) Dr. A.A.Kazmi (PI, IITR)	4 Years (03/20-02/24)	DST

### **GROUNDWATER HYDROLOGY DIVISION**

Dr. M. K. Goel, Sc. "G" and Head, Groundwater Hydrology Division (GHD) 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 2022-23 and the proposed work program for 2023-24. It was informed that in addition to progress in various studies and sponsored projects, three software have been developed during the year and three new internal studies have been planned. Subsequently, detailed discussion on various studies were made by the respective Scientists (PIs) of various studies. The discussion on these studies is summarized below:

S. No.	Title of Project/Study	Recommendations/Comments
<b>Internal Studies (Completed)</b>		
1. NIH/GWH/N IH/20-22	Integrated GEE-MODFLOW based Groundwater Recharge Assessment System for Hindon River System	Director desired to make a presentation for the CGWB and DoWR, RD & GR officials.
<b>Internal Studies (Ongoing)</b>		
1. NIH/GWH/N IH/22-25	Studying arsenic genesis and developing alternate water supply management strategies in Ganga basin	No specific comments were made by the WG Members.
2. NIH/GWH/N IH/22-24	Conjunctive Management of Water Resources in IGNP Command	Dr. Dimri suggested to analyze the water-logged area before and after the introduction of IGNP. PI agreed to the suggestion.

3. NIH/GWH/N IH/22-24	Studying Groundwater Dynamics using Machine Learning and Numerical Modelling	No specific comments were received from the members.
<b>Sponsored Projects (Completed)</b>		
1. NIH/GWH/PD S/17-21	Assessment of Impacts of Groundwater Salinity on Regional Groundwater Resources, Current and Future Situation in Mewat, Haryana-Possible Remedy and Resilience Building Measures	Not Presented
2. NIH/GWH/PD S/17-21	Ganges Aquifer Management in the Context of Monsoon Runoff Conservation for Sustainable River Ecosystem Services - A Pilot Study	Not Presented
3. NIH/GWH/AP N/22	Capacity Development Program on Site Suitability Mapping for MAR under Varying Climatic Conditions using Remote Sensing and Machine Learning based Hydrological Modelling Tools	PI presented the <i>PraJal</i> portal developed in the study. No specific comments were made by the WG Members.
<b>Sponsored Projects (Ongoing)</b>		
1. NIH/GWH/B GS/17-20	Groundwater Fluctuations and Conductivity Monitoring in Punjab -Groundwater resilience and adaptation to future changes in climate and water resource demands	Dr. S. M. Sharma advised to look the ownership of the installed piezometers in this project. PI noted.
2. NIH/GWH/C EHM/18-22	Integrated Management of Water Resources for Quantity and Quality in Upper Yamuna Basin up to Delhi	Not Presented
3. NIH/GWH/D ST/19-23	Enhancing Food and Water Security in Arid Region through Improved Understanding of Quantity, Quality and Management of Blue, Green and Grey Water	No specific comments were received from the members.
4. NIH/GWH/C CRBF/20-23	Expansion of Indo-German Competence Centre for Riverbank Filtration	The members appreciated for the efforts and no specific comments were offered.
5. NIH/GWH/D ST/21-24	Partitioning Evapotranspiration into Evaporation and Transpiration fluxes using Stable Isotopes of Oxygen and Hydrogen	Prof. Dimri and Dr. M. Samuel suggested to validate the results. PI replied for the queries.
<b>Internal Studies (New)</b>		
1. NIH/GWH/ 22-24	Hydrogeological and Isotopic investigation of groundwater in Himalayan Watershed of Kashmir, India	Dr. Bhishm Kumar supported the study & expressed need of isotope-based studies for Jammu & Kashmir. The WG agreed the proposal.
2. NIH/GWH/ 23-24	Development of Archive of Soil Hydraulic Characteristics	Dr. Bhishm Kumar and other members felt the need of such type of studies to disseminate outcomes for wider application/use/replication for other labs. The WG agreed the proposal.
3. NIH/GWH/ 23-25	Enhancement and application of NIH_WISDOM	There were no specific comments and WG agreed the proposal.

Finally, on the advice of the Director, Dr. M. K. Goel made a brief presentation about the NIH\_ReSyP software developed at NIH for comprehensive reservoir-related analysis and its applications for the Upper Krishna basin. Dr. M. Samuel asked whether variable downstream channel capacity is being considered in the flood simulation module. It was informed that based on the observations from recent flooding in Kerala, variable downstream channel capacity option has been included. Dr. Bhishm Kumar suggested for its application and testing with some reservoir analysis for foreign reservoirs. He shared the contact details of Dr. Nachiappan who is working in Australia on reservoir-related aspects and may be helpful for such applications. The members appreciated for the efforts. The final proposed work program for the year 2023 – 24 is given below:

**RECOMMENDED WORK PROGRAMME FOR THE YEAR 2023-24**

S. No.	Title of Project/Study	Project Team	Duration	Funding
<b>Internal Studies (Ongoing)</b>				
1. NIH/GWH/N IH/22-25	Studying arsenic genesis and developing alternate water supply management strategies in Ganga basin	Sumant Kumar (PI), Surjeet Singh, Rajesh Singh, Gopal Krishan, S. S. Rawat, M. K. Sharma, N. Patidar, P. K. Mishra, M. K. Goel	3 years (04/22 – 03/25)	NIH
2. NIH/GWH/N IH/22-24	Conjunctive Management of Water Resources in IGNP Command	Nitesh Patidar (PI), M. K. Goel, Anupma Sharma, Surjeet Singh, Gopal Krishan, Sumant Kumar, Nidhi Kalyani	2 years (04/22 – 03/24)	NIH
3. NIH/GWH/N IH/22-24	Studying Groundwater Dynamics using Machine Learning and Numerical Modelling	Nidhi Kalyani (PI), Anupma Sharma, Nitesh Patidar, Sumant Kumar	2 years (04/22 – 03/24)	NIH
<b>Sponsored Projects (Ongoing)</b>				
1. NIH/GWH/B GS/17-20	Groundwater Fluctuations and Conductivity Monitoring in Punjab -Groundwater resilience and adaptation to future changes in climate and water resource demands (title modified by funding agency)	Gopal Krishan (PI), S. Singh, C. P. Kumar (retd.), M. S. Rao; <i>BGS-UK</i> : Dr. Dan Lapworth, Dr. Alan MacDonald, Dr. Daren Goody	5 years (12/17-11/22, ext. till Nov. 2024)	BGS: UK
2. NIH/GWH/C EHM/18-22	Integrated Management of Water Resources for Quantity and Quality in Upper Yamuna Basin up to Delhi	Anupma Sharma (PI) Sanjay K. Jain, A. Sarkar, M. K. Sharma, L. N. Thakural, S. Kumar, P. K. Mishra, V. Singh, N. Patidar, N. Kalyani <b>Partners</b> : HIWRD, UPGWD, UYRB, CWC	4 years (04/18-01/24)	NHP
3. NIH/GWH/D ST/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) Gopal Krishan, Nitesh Patidar, P. K. Mishra <b>(Lead</b> : CAZRI Jodhpur, <b>Partners</b> : NIH Roorkee, IISWC Dehradun, CSWRI & CIAH, Bikaner, NIAM Jaipur)	5 years (03/19 - 01/24)	DST
4. NIH/GWH/C CRBF/20-23	Expansion of the Indo-German Competence Centre for Riverbank Filtration – CCRBF	Gopal Krishan (PI & Co- ordinator)	3 years (07/20 – 06/23)	Federal M/o Edu. & Res., Germany
5. NIH/GWH/D ST-SERB/21- 24	Partitioning Evapotranspiration into Evaporation and Transpiration fluxes using Stable Isotopes of Oxygen and Hydrogen	Gopal Krishan (PI), M. S. Rao	3 years (04/21 – 03/24)	DST-SERB
<b>Internal Studies (New)</b>				
1. NIH/GWH/ 22-24	Hydrogeological and Isotopic investigation of groundwater in Himalayan Watershed of Kashmir, India	Gopal Krishan (PI) M. S. Rao; <i>SKUAST-Srinagar</i> Rohitashv Kumar	1.5 years (09/22 – 03/24)	NIH
2. NIH/GWH/ 23-24	Development of Archive of Soil Hydraulic Characteristics	Surjeet Singh (PI); Nitesh Patidar; M. K. Goel; Anju Chaudhary; Anupma Sharma	1 year (04/23- 03/24),	NIH
3 NIH/GWH/ 23-25	Enhancement and application of NIH_WISDOM	Nitesh Patidar (PI), D. S. Bisht, M. K. Goel, T. Thomas, Sunil Gurrapu, Anupma Sharma, Surjeet Singh	2 years (10/23 – 09/25)	NIH

## **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. The progress of each individual study for the year 2022-23 and the proposal for the new studies was presented by the respective P.I. of the study. Since Sh Hukam Singh, Sc. 'B' got retired the presentation of his completed study was made on his behalf by Dr. M. Someshwar Rao, Sc-F. Studies already presented under NHP were not presented. The comments/actions suggested by the working group for various studies are given below:

SN	Title of Project/Study	Recommendations/Comments
<b>Internal Studies (Completed)</b>		
1.	Assessment of dissolved radon concentration in groundwater of Uttarakhand	No specific comments/suggestions received
<b>Internal Studies (Ongoing)</b>		
1.	Assessment of the Possible Impact of Climate Change on Evapotranspiration for Different Climatic Regions Of India	Not presented
2.	Ascertaining the efficacy of use of State of the art technologies for spring mapping and sustainability of springs through suitable interventions	No specific comments/suggestions received
<b>Sponsored Projects (Completed)</b>		
1.	Dating very old ground waters of deeper aquifers in Ganga Plains, India	Not presented
2.	Chemical & Isotopic Characterization of Deep Aquifer Groundwater of Middle Ganga Basin	Not presented
3.	Integrated Study on groundwater dynamics in the coastal aquifers of West Bengal for sustainable groundwater management	Not presented
4.	Development of a comprehensive plan for conservation and sustainable management of Bhimtal and Naukuchiatal lakes, Uttarakhand	Not presented
5.	Groundwater Rejuvenation As Climate change Resilience for marginalized and gender sensitive Ganges (GRACERS)	Not presented
6.	Web-GIS Based Spring Inventory for Vulnerability Assessment and Hydro-Geological Investigation of Selected Springs for Sustaining Local Water Demand in Ravi Catchment of Himachal Pradesh	Not presented
7.	Web-enabled Inventory of Natural Water Springs of Tawi River Catchment of Jammu and Kashmir State of India for Vulnerability Analysis and Developing Adaptive Measures for Sustaining Tawi River	Video Presentation
<b>Sponsored Projects (Ongoing)</b>		
1.	Leachate transport modelling for Gazipur landfill site for suggesting ameliorative measures	Not presented
2.	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	No specific comments/suggestions received
<b>Internal Studies (New)</b>		
1.	Developing a Stable Isotopic Analysis System for analyzing the dissolved Nitrates in water	No specific comments/suggestions received
2.	Geo-Hydro-Chemical and Isotopic Aspects of Occurrence of Springs: A case study from the major settlement areas of Bhagirathi basin, Uttarakhand, India	No specific comments/suggestions received

3.	Feasibility of Open Sources Data for the Estimation of Runoff and Water Storage Capacity for Rainwater Harvesting Strategies	Dr. Praveen Thakur suggested to modify the title from feasibility to application since it is not a feasibility study. Sh. Sudhindra Mohan Sharma suggested to change the objectives as present objective are more like work elements
4.	Sedimentation and Water Quality Studies of Phulahar Lake, Pilibhit (U.P.)	No specific comments/suggestions received

Head (HID) also informed about the technology transfer activities organized by the Division during 2022-23.

**Table : Details of training Courses/Workshops organised by the Division during 2022-23**

S. N.	Topic	Duration	Coordinator	Venue	Participants
1.	Scientific Data Collection and Processing Techniques for Springshed Management and Rejuvenation	19-22.12.2022	Dr. S. M. Pingale & Dr. S. S. Rawat	IRI, Roorkee	24
2.	Springshed Management	13-15.12.2022	Dr. S. S. Rawat	DoLR, Kohima, Nagaland	47
3.	Scientific Data Collection and Techniques for Springshed Management and Rejuvenation	06-09.09.2022	Dr. S. S. Rawat	NEHARI, Guwahati	28
4.	Tools and Techniques for Springshed Management	03.09.2022	Dr. S. S. Rawat	Govt. Degree College, Udhampur (J&K)	80
5.	Groundwater contaminant transport monitoring & modelling	23 to 27.05.2022		Online Under NHP – PDS - 19	40
6.	Stakeholder Meeting Under DST-NWO Hindon Project	15th Feburary,2023	Ms. Anjali,	c-Ganga office, New Delhi.	10

**RECOMMENDED WORK PROGRAMME OF FOR THE YEAR 2023-24**

S. N.	Title of Project/Study	Study Team	Duration	Funding
<b>Internal Studies (Ongoing)</b>				
1.	Assessment of the Possible Impact of Climate Change on Evapotranspiration for Different Climatic Regions Of India	S.D.Khobragade (PI); Dr. Vishal Singh, Sudhir Kumar	3 years (04/22-03/25)	NIH
2.	Ascertaining the efficacy of use of State of the art technologies for spring mapping and sustainability of springs through suitable interventions	Soban Singh Rawat, (PI); Sudhir Kumar, Santosh M. Pingale; P K Mishra; D. S. Bisht; Rajesh Singh	3 years (04/22-03/25)	NIH
<b>Internal Studies (New)</b>				
1.	Developing a Stable Isotopic Analysis System for analyzing the dissolved Nitrates in water	M. S. Rao(PI) Vishal Gupta	1 and ½ years (04/23-09/24)	NIH



S. N.	Title of Project/Study	Study Team	Duration	Funding
2	Geo-Hydro-Chemical and Isotopic Aspects of Occurrence of Springs: A case study from the major settlement areas of Bhagirathi basin, Uttarakhand, India	Dr. Soban Singh Rawat, (PI); S. D. Khobragade; M K Sharma; M S Rao; S.M. Pingale; P. K. Mishra	3 years (04/23- 03/26)	NIH
3	Feasibility of Open Sources Data for the Estimation of Runoff and Water Storage Capacity for Rainwater Harvesting Strategies	S.M. Pingale (PI) Soban Singh Rawat, S. D. Khobragade Rajeev Gupta	2 Years (04/23- 03/25)	NIH
4	Sedimentation and Water Quality Studies of Phulahar Lake, Pilibhit (U.P.)	Rajeev Gupta (PI) S. D. Khobragade S.M. Pingale	2 Years (04/23- 03/25)	NIH
<b>Sponsored Projects (Ongoing)</b>				
1.	Leachate transport modelling for Gazipur landfill site for suggesting ameliorative measures	Anjali (PI) Sudhir Kumar, J. V. Tyagi M. K. Sharma Partner: CGWB (Delhi unit)	3½ years (11/19 – 06/23)	NHP- PDS
2.	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	Sudhir Kumar, (Proj. Coordinator), M. K. Sharma, (PI), Suhas Khobragade, Anjali, Vishal Singh, SM Pingale, Nitesh Patidar, Surjeet Singh.	5 Years (04/22 – 03/27)	DST

### **SURFACE WATER HYDROLOGY DIVISION**

Dr. A.K. Lohani, Sc G & Head, Surface Water Hydrology Division presented the 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. Sponsored studies are not presented. The record of discussions for the respective study is given below:

#### **Work Program for the Year 2022-23**

S. N.	Title of Project/Study	Status and Recommendations/ Suggestions
<b>Internal Studies (Completed)</b>		
1.	Probabilistic dam break flood wave simulation and flood risk assessment for preparation of EAP for Mahi Bajaj Sagar dam in Rajasthan	Completed. No specific action suggested.
2.	Uncertainty in rating curves and discharge estimation	Completed. There were no specific comments from the members on the study.
3.	Application of unified-extreme-value (UEV) distribution for flood frequency: selected rivers of U.S.A	Completed. No specific action was suggested.
4.	Application of unified-extreme-value (UEV) distribution for flood frequency: Comparison of results using GEV distribution	Completed. No specific action was suggested.
<b>Sponsored Projects (Completed)</b>		

1.	Dam break studies of Kandaleru and Pulichintala dams in Andhra Pradesh (NHP)	Completed. The study was reported.
<b>Internal Studies (Ongoing)</b>		
1.	Development of Cloud Data Based Integrated Framework to Forecast Flood for Efficient Operation of Reservoirs	No specific action was suggested.
2.	Flood Forecasting under Changing Climate Conditions - Role of Machine Learning and Conceptual/Physical based Model	No specific action was suggested.
3.	Hydrological Study to conserve the water resources of Bikaner, Rajasthan	No specific action was suggested.
4.	Review of design flood and dam break analysis of Khadakhai Dam in Odisha	No specific action was suggested.
5.	Investigation on occurrences of seasonal extremes across Northwest Himalaya in relation to global atmospheric thermal and circulation changes	The study was not presented.
6.	Investigating gap areas, current trends and future directions of research in Climate Change Impact on Hydrology and water Resources in India through Scientometrics	PI requested for provision of a resource person for the study as well as extension of the study by six months (up to April 30, 2024) and WG approved the extension. No other specific comments were received.
7.	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.
<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 not presented.
<b>Internal studies (New)</b>		
1.	Estimation of confidence intervals of index flow duration curves	PI presented the objectives and scope of the proposed study. There were no specific suggestions/comments from the members.
2.	Hydraulic force-inversion equation for exact modeling of hydraulic jumps in rectangular channels	PI presented the objectives and scope of the proposed study. No specific action was suggested.

### RECOMMENDED WORK PROGRAMME FOR THE YEAR 2023-24

S. N.	Title of Project/Study	Study Team	Duration	Funding
<b>Internal studies (Ongoing)</b>				
1.	Development of Cloud Data Based Integrated Framework to Forecast Flood for Efficient Operation of Reservoirs	A. K. Lohani; R. K. Jaiswal J.P. Patra; P. C. Nayak Vishal Singh	2 Years (April 2022 – March 2024)	NIH
2.	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 to June 2025)	NIH

3.	Hydrological Study to conserve the water resources of Bikaner, Rajasthan	L. N. Thakural; M. K. Sharma; R. K. Jaiswal; J. P. Patra; P. K. Mishra; Nitesh Patidar; N. K. Bhatnagar; Jatin Malhotra; Anil Kumar Chhangani	2 Year (July 2022 to June 2024)	NIH
4.	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	3 Year (April 2022 to March 2025)	NIH
5.	Investigation on occurrences of seasonal extremes across Northwest Himalaya in relation to global atmospheric thermal and circulation changes	Ashwini Ranade; P.K. Mishra Sunil Gurrapu	3 years (April 2022 to March 2025)	NIH
6.	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 Rohit Sambare; Charu Pandey	2 Year (May 2022 to April 2024, after extn.)	NIH
7.	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
<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)	03 years (July, 2020 – June, 2023)	STARS (MHRD, GoI)
<b>Internal studies (proposed)</b>				
1.	Estimation of confidence intervals of index flow duration curves	Sanjay Kumar, Sunil Gurrapu; L. N. Thakural; J. P Patra	02 Years (April 2023 to March 2025)	NIH
2.	Hydraulic force-inversion equation for exact modeling of hydraulic jumps in rectangular channels	Sushil K. Singh	One Year (April 2023 to March 2024)	NIH

### **WATER RESOURCES SYSTEMS DIVISION**

Dr. Sanjay K Jain (SKJ), Sc. G and Head, presented an overview of the division – scientific strength, the ongoing studies, sponsored & consultancy studies, technical publications and training courses organized. Dr. Jain informed that a Centre for Cryosphere and Climate Change has been established in the Division. Thereafter, PIs of the respective studies presented the progress and the details is given below:

SN	Title of Project/Study	Recommendations/ Suggestions
<b>Internal Studies (Completed)</b>		
1.	Seasonal characterization of Gangotri Glacier melt runoff and simulation of stream flow variation under different climate scenarios	No specific comments were received.
2.	Impacts of glacier and climate change on runoff for selected basins of Himalayan region	No specific comments were received.
<b>Sponsored Projects (Completed)</b>		

1.	Assessment of seasonal variations in Hydrology and Cryosphere of upper Ganga Basin	Not Presented
<b>Internal Studies (Ongoing)</b>		
1.	Monitoring and Hydrological Modelling of Henvel watershed in Lesser Himalaya	No specific comments were received.
2.	Spatio-temporal Water Availability under Changing Climate and Land use Scenarios in Wainganga River Basin	No specific comments were received.
3.	Climate change scenarios for Andhra Pradesh and its impact on streamflow and groundwater levels in Pennar River basin	Dr. Ramakar Jha suggested to consider different climatic zones of India for selection of GCMs. Dr. Sanjay K Jain suggested to further discuss with Prof. Dimri in this matter.
<b>Sponsored/Collaborative Projects (Ongoing)</b>		
1.	Snow and glacier contribution and impact of climate change in Teesta river basin in Eastern Himalaya	Not presented.
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	Not presented.
3.	Development of Water Accounts for the different sub-basins in the state of Nagaland Using Water Accounting Plus (WA+) Framework	Not presented.
4.	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 sub-basins in the state of Mizoram	Not presented.
5.	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	No specific comments were received in this collaborative study with IIRS.
6.	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	Not presented.
<b>Internal Studies (New)</b>		
1.	Monitoring and Modelling of Gangotri watershed (Bhojwasa) under different Climate Scenarios	Dr. A. P. Dimri suggested to undertake the Mass Balance of Glacier.
2.	Glacier recurrence survey, Instrumentation and Modeling to study the Batal Glacier in part of Western Himalaya, India	Dr. Dimri suggested to see the other sites in the nearby area before finalisation of the site.

**RECOMMENDED WORK PROGRAMME FOR THE YEAR 2023-2024**

SN	Title of Project/Study	Study Team	Duration	Funding (Rs. Lakhs)
<b>Internal Studies (Ongoing)</b>				
1.	Monitoring and hydrological modeling of Henval watershed in Lesser Himalaya	M K Nema; Sanjay K Jain; P K Mishra;	3 years (08/20-07/23)	NIH (10.22)
2.	Spatio-temporal Water Availability under Changing Climate and Landuse Scenarios in Wainganga River Basin	M K Nema; P K Mishra; Rahul Jaiswal	2 years (04/22-03/24)	NIH (9.72)
3.	Climate change scenarios for Andhra Pradesh and its impact on streamflow and groundwater levels in Pennar River basin	Sunil Gurrapu; Nitesh Patidar; YRS Rao; R Venkata Raman; TVNAR Kumar	2 years (04/22-03/24)	NIH
<b>Sponsored/Collaborative Projects (Ongoing)</b>				
1.	Snow and glacier contribution and impact of climate change in Teesta river basin in Eastern Himalaya	Sanjay K. Jain P K Singh; M. Arora; A K Lohani; Vishal Singh	3 years (11/19-11/22) Extended up to 09/23	NMHS- MoEF (143)
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 06/23	NHP (14.50)
3.	Development of Water Accounts for the different sub-basins in the state of Nagaland Using Water Accounting Plus (WA+) Framework.	P K Mishra; P K Singh; Vishal Singh; P K Agarwal	2 years (04/21-06/23)	NHP (9.00)
4.	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 sub-basins in the state of Mizoram	Vishal Singh; M K Nema; P K Singh; Vanlalpekhlua Sailo (SDO from Mizoram); Lalruatkima (JE from Mizoram)	3 years (04/21-03/24)	NHP (25.00)
5.	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; Sanjay K Jain; P. K. Mishra; Praveen Thakur (IIRS)	3 years (04/22-03/25)	IIRS (30.91)
6.	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	P K Singh; Vishal Singh; Sanjay K Jain; Abhilash R.	3 years (04/22-03/25)	NHP (54.0)
<b>Internal Studies (New)</b>				
1.	Monitoring and Modelling of Gangotri (Bhojwasa) watershed under different Climate Scenarios	P K Mishra; Vishal Singh; Sunil Gurrapu; Manohar Arora; Sanjay K Jain; Jatin Malhotra	3 years (04/23-03/26)	NIH (57.0)
2.	Glacier recurrence survey, Instrumentation and Modeling to study the Batal Glacier in part of Western Himalaya, India	Vishal Singh; P K Mishra; Sunil Gurrapu; Sanjay K Jain; Manohar Arora; Jatin Malhotra	5 years (04/23-03/28)	NIH (71.0)

**DETAILS OF TRAINING/ WORKSHOP DURING APRIL, 2022 - MARCH, 2023**

SN	Title of Training Course/Workshop	Coordinators	Duration	Venue
1.	Twelve-day Training programme on “Water Resources Planning and Management” sponsored by META Nashik for the engineers of the Water Resource Department (WRD) of the Government of Maharashtra	Smt. D. Chalisgaonkar, Scientist G Er. P. K. Agarwal Scientist B	April 15-25, 2022	NIH, Roorkee
2.	Five-day Training on “National Hydrology Model” under the National Hydrology Project (NHP)	Dr. A. K. Lohani Scientist G Dr. S. K. Jain Scientist G	August 01-05, 2022	NIH, Roorkee
3.	Five-day online Training on “Hydrological Modeling using Soil and Water Assessment Tool (SWAT): Theory and Hands-on” sponsored by National Hydrology Project (NHP).	Dr. M. K. Nema Scientist D Dr. Vishal Singh Scientist D	August 22-26, 2022	NIH, Roorkee
4.	Five-day Training Course on “Application of Water Accounting Plus (WA+) Tool for Water Resources Management” under National Hydrology Project.	Dr. P. K. Mishra Scientist D Dr. P. K. Singh Scientist D	28 Nov. – 02 Dec., 2022	Kohima, Nagaland
5.	One-week Training Program on “Climate Change and Hydrological Impact Assessment”	Dr. Sunil Gurrapu Scientist C Dr. L N Thakural Scientist D	December 12-17, 2022	NIH, Roorkee
6.	Five-day Training Program on “Flood prone area mapping and modelling” for the Irrigation and Water Resources Dept., Govt. of Mizoram	Dr. Vishal Singh Scientist D	March 20 – 24, 2023	NIH, Roorkee

**RESEARCH MANAGEMENT AND OUTREACH DIVISION (RMOD)**

Er. Omkar Singh, Sc. G & Head, requested Dr. A. R. Senthil Kumar, Sc G to present the overview of the Division’s activities and progress of studies during 2022-23. Dr. A. R. Senthil kumar presented tables showing the studies and outreach activities proposed for the F.Y. 2023-24. He also presented the progress of the studies/project along with the input of Er. Omkar Singh as given below:

SN	Title of Project/Study	Recommendations/Suggestions
<b>Internal (Ongoing)</b>		
1.	Integrated assessment of water resources for sustainable use in Upper Dhasan basin in Bundelkhand Region, Central India	WG was informed a need for extension up to June 2023 as conveyed by the PI.
2.	Establishing hydrological regime and ecohydrological functions of Jhilmil Jheel Wetland, Haridwar District	The study was not presented due to long leave of PI on medical ground.
3.	Hydrology-based scenario planning for water productivity and optimization of income from farming practices in Mewat Region, Haryana	PI requested for extension of the study up to June 2023. There were no comments.
4.	Development of Water Security Plan for Healthcare Facilities: A Pilot Study for Swami Rama Himalayan University (SRHU-HIHT), Jolly Grant, Dehradun	Proposed to drop the study due to non-availability of requisite data/resource.
<b>Sponsored (Ongoing)</b>		
1.	Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)-DST sponsored	Sponsored project was reported in WG meeting.

**RECOMMENDED WORK PROGRAM FOR THE YEAR 2023-24 (RMOD)**

S.N.	Title of Project/Study	Study Team	Duration	Funding (Rs. Lakh)
<b>Internal Study (Ongoing)</b>				
1.	Integrated assessment of water resources for sustainable use in Upper Dhasan basin in Bundelkhand region	Jyoti Patil (PI) T Thomas (Co-PI), P K Mishra Rohit Sambare	Sep 2020- Jun 2023	NIH
2.	Establishing hydrologic regime and ecohydrological functions of Jhilmil Jheel wetland (Haridwar District, Uttarakhand)	Rohit Sambare (PI) V C Goyal (Co-PI), Suhas Khobragade, N R Allaka; Gajendra Singh-USAC, Dehradun; WI-SA, New Delhi; HESCO, Dehradun	Sep 2020- Aug 2023	NIH
3.	Hydrology-based scenario planning for water productivity and optimization of income from farming practices in Mewat region, Haryana	A R Senthil Kumar (PI), Omkar Singh (Co-PI) Rajesh Agarwal, N R Allaka Scientist from KVK/Agri Univ.	Sep 2020- Jun 2023	NIH
<b>Sponsored Projects (Ongoing)</b>				
1.	Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)	Omkar Singh (PI), Rajesh Singh (Co-PI), V.C. Goyal (Ex- PI), Jyoti P. Patil, Rohit Sambare, Rajesh Agarwal, NR Allaka and Project Staff-HQ (IC-EcoWS) <b>Partners:</b> NIH, MNIT-Jaipur, IIT-Bombay, IRMA-Anand	Apr 2019-Mar 2024	DST-GoI (510)

**Proposed Training/Webinar/Outreach Activities of RMOD (2023-24)**

S.N.	Activity	Tentative Month	Place	Target Participants	Team
1.	5-days training on “Life Cycle Approach for Rejuvenation of Ponds and Lakes using Nature-Based Solutions” sponsored by NWM	May/ June 2023	Roorkee	R&D Institutes/ Univ./Govt. Organizations	J P Patil/AR Senthil Kumar, Omkar Singh, Rohit Sambhare, Rajesh Agarwal, NR Allaka
2.	Stakeholders workshop for Upper Dhasan Basin water resources assessment	May/June 2023	Bhopal	CWC, CGWB, State Govt. Dept., etc.	J P Patil, T Thomas, P K Mishra, Rohit Sambhare
3.	Five-day training program on “Hydrology of water bodies and their development under climatic uncertainty”	Jul/Aug 2023	Roorkee	Irrigation/PHE /SWC departments	A. R. Senthil kumar, Jyoti Patil, Rohit Sambhare, Santosh M Pingale, N R Allaka

**Other Outreach Activities:**

S.N.	Activity			
1.	Preparation of short videos on R&D findings of selected NIH studies			
2.	Coordination & Organizing activities under Azadi Ka Amrit Mahotsav-Phase 2.0			
3.	Any other Outreach activity (exhibition) as assigned			
4.	Outreach activity on “Water Conservation & Water Security” in Schools	Oct/Nov/ Dec. 23	Schools (2 nos.)	Team: A. R. Senthil kumar, Omkar Singh, Rajesh Agarwal, N R Allaka

Sh. 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.

**List of Working Group Members who attended the 53<sup>rd</sup> WG meeting**

1.	Dr. Sudhir Kumar, Director, NIH	Chairman
2.	Dr. Vijay Kumar, Ministry of Earth Sciences, New Delhi	Member
3.	Dr. Prashant Rai, CGWB, Dehradun	Member
4.	Dr. Praveen Thakur, IIRS, Dehradun	Member
5.	Prof. A.K. Saraf, IIT, Roorkee	Member
6.	Dr. Manoj P. Samuel, CWRDM, Kozhikode	Member
7.	Dr. Bhishm Kumar, IAEA (Retd.), Roorkee	Member
8.	Prof. Ramakar Jha, NIT, Patna	Member
9.	Prof. A.P. Dimri, Indian Institute of Geomagnetism, Mumbai	Member
10.	Dr. (Mrs.) Sadhana Malhotra, Mindspace, Dehradun	Member
11.	Sh. Sudhindra Mohan Sharma, Ex-Nodal Officer, MoDWS, Indore	Member
12.	Prof. K.K. Singh, NIT, Kurukshetra	Member
13.	Dr. Sanjay K. Jain, Sc. G & Head WRS Division, NIH	Member
14.	Dr. M.K. Goel, Sc. G & Head GWH Division, NIH	Member
15.	Dr. A.K. Lohani, Sc. G & Head SWH Division, NIH	Member
16.	Dr. R.P. Pandey, Sc. G & Head EH Division, NIH	Member
17.	Dr. Suhas Khobragade, Sc. G & Head HI Division, NIH	Member
18.	Er. Omkar Singh, Sc. G & Head, RMO Division, NIH	Member-Secretary

**Scientists from NIH**

	<b>EH Division</b>		<b>SWH Division</b>
1.	Dr. M.K. Sharma, Sc. F	16.	Dr. S.K. Singh, Sc.F
2.	Dr. Rajesh Singh, Sc. D	17.	Dr. P.C. Nayak, Sc. F
3.	Dr. Pradeep Kumar, Sc. D	18.	Dr. Sanjay Kumar, Sc. F
4.	Dr. Vinay K. Tyagi, Sc. D	19.	Dr. Archana Sarkar, Sc. F
5.	Dr. Kalzang Chhoden, Sc. C	20.	Dr. L.N. Thakural, Sc. D
	<b>GWH Division</b>	21.	Dr. J.P. Patra, Sc. D
6.	Dr. Anupma Sharma, Sc. G	22.	Dr. R.V. Kale, Sc. D
7.	Dr. Surjeet Singh, Sc. F	23.	Sh. N.K. Bhatnagar, Sc. B
8.	Dr. Gopal Krishan, Sc. D	24.	Sh. Om Prakash, Sc. B
9.	Dr. Nitesh Patidar, Sc. C		<b>WRS Division</b>
10.	Ms. Nidhi Kalyani, Sc. B		
	<b>HI Division</b>	25.	Dr. Manohar Arora, Sc. F
11.	Dr. M.S. Rao, Sc. F	26.	Dr. P.K. Singh, Sc. D
12.	Dr. Soban S. Rawat, Sc. E	27.	Dr. Manish Nema, Sc. D
13.	Dr. Santosh M. Pingale, Sc. D	28.	Dr. P.K. Mishra, Sc. D
14.	Smt. Anjali, Sc. C	29.	Dr. Sunil Gurrapu, Sc. D
	<b>RMO Division</b>	30.	Dr. Vishal Singh, Sc. D
15.	Dr. A.R. Senthil Kumar, Sc. G		

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

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