

MINUTES OF 76th MEETING OF TECHNICAL ADVISORY COMMITTEE (TAC) OF NATIONAL INSTITUTE OF HYDROLOGY

Held on 29 August 2022 (Offline & Online mode)

The 76th meeting of the Technical Advisory Committee (TAC) of the National Institute of Hydrology, Roorkee was held in hybrid mode on 29th August 2022 at Roorkee. The meeting was chaired by Dr. R.K. Gupta, Chairman, CWC. The list of the participants is given in Annexure-I.

Dr. J.V. Tyagi, Director, NIH first welcomed the Chairman, Members and invitees. He briefed about the role of the Working Group and Regional Coordination Committees constituted to review the work programme at headquarters and regional centers of NIH. After a round of brief introduction of members and invitees, Director invited the Chairman, TAC for his opening remarks. At the outset, the Chairman welcomed all the participants in his opening remarks. He appreciated the research being carried out by the Institute and desired to work together with other organizations (like CWC, IMD) in various areas related to hydrology. He mentioned that NIH is taking lead role in various research studies related to climate change, groundwater hydrology, sedimentation, salt intrusion, etc. He advised that NIH, CGWB, and the Tamil Nadu Water Resources Department can work together on salt intrusion problems. The Chairman desired that NIH should explore the deficit irrigation scenario, and this may be worked out jointly with NIH and WTC-IARI (New Delhi). The Chairman made a strong case for forming a joint group of NIH and CWC to work on identified studies and problems.

After opening remarks by the Chairman, Director, NIH invited Dr. V. C. Goyal, Scientist G & Head, RMOD/Member-Secretary took up the agenda items in the meeting.

ITEM NO. 76.2: Confirmation of the Minutes of 75th Meeting of TAC

The Member-Secretary informed that minutes of the 75th meeting of TAC, held on September 1, 2021 in virtual mode were circulated to all the members and invitees vide email dated September 22, 2021. Since no comments were received from the members, the Minutes were confirmed by the TAC.

ITEM NO. 76.3: Action Taken on Decisions/Recommendations in the Previous Meeting

The Member-Secretary presented the action taken on the comments and suggestions of the members during the previous meeting. On issue of pending case of the creation of a post of documentation officer, Chairman suggested to constitute an internal committee to look after the requisite task of compilation of hydrological research in India on identified topics. Regarding the issue of hydrological inputs as applicable to IDEA, Director NIH advised Dr P K Singh, Scientist D-NIH, to explore if outputs of WA+ can be uploaded on the IDEA portal.

ITEM NO. 76.4: Status of the Work Programme for the Year 2021-22

The Member-Secretary briefly mentioned about the studies carried out by the Institute during the year 2021-2022. He reported that twenty two sponsored projects and twenty internally funded

R&D studies were completed during the year. Members appreciated the number of publications brought out by the Institute and number of training/workshop/symposium organized by the Institute. The following studies completed during 2021-2022 were presented during the meeting:

- a) Statistical evaluation of Global precipitation estimates over data scarce Western Himalayan region of India – *Shri D.S. Bisht, Scientist 'B'*
- b) Water Quality Assessment of South West Punjab emphasizing Carcinogenic Contaminants and their possible Remedial Measures - *Dr. Rajesh Singh, Sc. 'D'*
- c) Evaluation of the influence of low frequency atmosphere ocean oscillations on annual floods in Godavari and Narmada river banks - *Dr. Sunil Gurrapu, Sc. C*

Regarding the first study, Prof. K.V. Jayakumar appreciated the study. as it has direct relevance for data scarce regions.

In the second study, Prof. A. K. Sharma advised to include a comparison of WQI and HHI of groundwater in the study area. Prof. K. V. Jayakumar advised to include the sources responsible for the change in the water quality during pre- and post- monsoon in the report. Dr. R. K. Gupta, Chairman CWC and Er. J. Chandrashekar Iyer, Member (D&R), CWC advised to include a disclaimer in the report to avoid panic in the society.

In the third study, Prof. K V Jayakumar advised to explore more relevant literature of Godavari basin from various studies on flood and droughts. Dr. Man Singh asked to give future projections in this study.

TAC noted the progress of the works of the Institute during the year 2021-2022.

General comments on completed studies:

1. There should not be duplication of studies between CWC and NIH
2. Completed studies should be put on website and monitor the number of users for reference.

ITEM NO. 76.5: Proceedings of the Working Group and Regional Coordination Committee (RCC) Meetings

The Member-Secretary briefly mentioned about the 52nd meeting of the Working Group of NIH which was held during 12-13 April 2022 and the RCC meetings held at the different Regional Centres. During these meetings, the Working Group/RCC members reviewed the progress of studies for the year 2021-2022 and recommended the work program for 2022-23.

The Chairman expressed the need to take joint studies with CWC on focused topics such as climate change and its impact on water resources. Director, NIH requested Chairman to identify a nodal officer from CWC to interact with NIH for collaborative studies through recently developed Centre of Cryosphere Studies for Climate Change Studies at NIH. Member (D&R) also raised concern to take up joint studies with CWC in focused areas including dam break studies, etc.

The Chairman expressed his concern on a study entitled “ Long term hydrological assessment for the development of water security plan for three sub-basins namely Barak, Minor rivers draining

into Bangladesh and Minor rivers draining into Myanmar sub-basins in the state of Mizoram “ being carried out at RC Guwahati under NHP. He advised to maintain confidentiality of such studies undertaken in the North East region and provide a copy to CWC on completion.

ITEM NO. 76.6: Work Program for the year 2022-23

The Member-Secretary briefly mentioned about the proposed work programme of the Institute for the year 2022-23 which was discussed during the 52nd Working Group meeting and various RCC meetings of NIH. The proposed work programme of the Institute for F.Y. 2022-23, as recommended by the Working Group and the respective RCCs, was also placed before the TAC.

TAC approved the work programme of the Institute for the year 2022-23 (Annexure-II).

ITEM NO. 76.7: Major projects and activities of national importance

It was informed by the Member-Secretary that the Institute has recently completed a project entitled National Mission for Sustaining the Himalayan Ecosystem (NMSHE)- funded by DST (GoI), and the following two major R&D projects are currently ongoing at NIH:

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

ITEM NO. 76.8: Reporting Items

Details of the ongoing consultancy projects in NIH up to 25th July 2022 were noted by the TAC.

ITEM NO. 76.9: Additional items with the permission of the Chair

No such items were discussed. The meeting ended with a vote of thanks to the Chair.

LIST OF PARTICIPANTS IN THE 76th MEETING OF TAC OF NIH

1.	Sh. R K Gupta, Chairman, CWC	In-chair
2.	Sh. J. Chandrashekhar Iyer, Member (D&R), CWC	Member
3.	Dr. J V Tyagi, Director, NIH	Member
4.	Dr. T. Chakraborty, CGWB, Faridabad	Member (Rep. of CGWB)(online)
5.	Prof. K V Jayakumar, NIT, Warangal	Member
6.	Dr. Man Singh, ICAR-IARI, New Delhi	Member
7.	Dr. A K Das, IMD, New Delhi	Member (Online)
8.	Prof. Arup Sarma, IIT, Guwahati	Member (Online)
9.	Sh. Shambhu Azad, WAPCOS, New Delhi	Member (Rep. WAPCOS) (Online)
10.	Dr.V C Goyal, Sc.G & Head RMO Division, NIH	Member-Secretary

INVITEES

1. Dr. Sudhir Kumar, Sc. G & Head, HI Division, NIH, Roorkee
2. Dr. Sanjay Jain, Sc. G & Head, WRS Division, NIH, Roorkee
3. Dr. M K Goel, Sc. G & Head, GWH Division, NIH, Roorkee
4. Dr. R P Pandey, Sc. G & Head, EH Division, NIH, Roorkee
5. Sh. B. Chakraborty, Sc. G, NIH, CFMS-Patna (Online)
6. Dr. Y R S Rao, S.G, NIH, RC-Kakinada (online)
7. Dr. S V Vijaya Kumar, Sc. G, NIH, RC-Guwahati (online)
8. Dr. Suhas Khobragade, Sc. G, NIH, Roorkee
9. Er. Omkar Singh, Sc. G, NIH, Roorkee
10. Dr. A R Senthil Kumar, Sc. F, NIH, Roorkee
11. Dr. Anupma Sharma, Sc. F, NIH, Roorkee
12. Dr. M S Rao, Sc. F, NIH, Roorkee
13. Dr. Surjeet Singh, Sc.F, NIH, Roorkee
14. Dr. P C Nayak, Sc.F, NIH, Roorkee
15. Dr. Sanjay Kumar, Sc.F, NIH, Roorkee
16. Dr. Manohar Arora, Sc.F, NIH, Roorkee
17. Dr. M K Sharma, Sc.E, NIH, Roorkee
18. Dr. Soban Singh Rawat, Sc.E, NIH, Roorkee
19. Dr. Mathew K. Jose, Sc.E, NIH, RC-Belagavi
20. Dr. Ravi Galkate, Sc.E, NIH, RC-Bhopal (online)
21. Dr. T Thomas, Sc.E, NIH, RC-Bhopal (online)
22. Dr. P K Singh, Sc.D, NIH, Roorkee
23. Dr. J P Patra, Sc.D, NIH, Roorkee
24. Dr. L N Thakural, Sc.D, NIH, Roorkee
25. Dr. Sumant Kumar, Sc.D, NIH, Roorkee
26. Dr. Rajesh Singh, Sc.D, NIH, Roorkee
27. Dr. Pradeep Kumar, Sc.D, NIH, Roorkee
28. Dr. Ashwini A. Ranade, Sc.D, NIH, Roorkee
29. Dr. Gopal Krishan, Sc.D, NIH, Roorkee
30. Dr. Jyoti P. Patil, Sc.D, NIH, LCU, New Delhi (online)
31. Er. Digamber Singh, Sc.D, NIH, Roorkee

32. Dr. P K Mishra, Sc.D, NIH, Roorkee
33. Dr. Vinay K. Tyagi, Sc.D, NIH, Roorkee
34. Dr. R K Jaiswal, Sc.D, NIH, RC-Bhopal (Online)
35. Dr. Jose Pottakkal, Sc.D, RC-Jammu (online)
36. Dr. R Venkata Ramana, Sc.D, RC-Kakinada (online)
37. Dr. Sunil Gurrapu, Sc.C, NIH, Roorkee
38. Dr. Vishal Singh, Sc.C, NIH, Roorkee
39. Dr. Sanjay Sharma, Sc.C, NIH, RC-Guwahati (online)
40. Dr. Shashi Poonam Indwar, Sc.C, RC-Bhopal (online)
41. Sh. Pravin Patil, Sc.C, NIH, CFMS-Patna (online)
42. Dr. Deepak Singh Bisht, Sc.B, NIH, RC-Jammu
43. Sh. Suryansh Mandloi, Sc.B, NIH, CFMS-Patna (Oline)

ENVIRONMENTAL HYDROLOGY DIVISION

Approved Work Programme for the Year 2022-23

SN	Study	Study Team	Duration/Status
Sponsored Projects (Ongoing)			
1.	Water Efficient Irrigation by Using SCADA System For Medium Irrigation Project (MIP) Shahnehar	Dr. R.P. Pandey, (PI). Er. Jagdeesh Patra, Dr. Rajesh Singh, Sh N. K. Bhatnagar,	3 years (12/17-12/20) Extension requested till 06/22 Project cost: Rs. 75.0 Lakh Status: In-progress
2.	Isotopic and geochemical approach to study vulnerable confined and unconfined drinking water aquifers in Varanasi and surrounding area	Rajesh Singh (PI) R. P. Pandey BHU, Varanasi (Lead) Other Collaborators: BARC, Mumbai, ICER, Hungary	3 years (07/21-07/24) Project cost: Rs. 10.0 Lakh Sponsored by: BHU Status: In-progress
Internal Study (Ongoing)			
3.	Simulation of Non-Point Source Pollution Processes in Song River	Pradeep Kumar (PI) J. V. Tyagi M. K. Sharma Rajesh Singh R. K. Nema	4 years (11/19-10/23) Project cost: Rs. 43.02 lakh Status: In-progress
4.	Influence of Anthropogenic Factors on River Ganga in the stretch from Rishikesh to Haridwar	Rajesh Singh (PI) J. V. Tyagi R. P. Pandey R.K. Nema Pradeep Kumar M. K. Sharma	2 Years (06/20-05/22) Project cost: Rs. 23.71 Lakh Sponsored by: Internal Status: In-progress
5.	Understanding Arsenic mobilization in groundwater of Haridwar and formulating remediation measures	Rajesh Singh (PI) R. K. Nema Sumant Kumar Pradeep Kumar M. K. Sharma	3 Years (07/21 – 06/24) Project Cost: 30.1 Lakhs Sponsored by: Internally Status: In-Progress
Internal Study (New)			
6.	Characterisation of Groundwater Dynamics in Krishna-Godavari Delta interims of groundwater levels, Hydrochemistry, Isotopes and Emerging Contaminants	M. K. Sharma (PI) RC, Kakinanda CGWB	2 years (04/22-03/24) Sponsored by: Internally Status: Proposed
Consultancy Projects			
7.	Estimation of Economic Losses in Real Terms per Hectare Basis due to Forest	J. V. Tyagi (Lead PI) R. P. Pandey (PI) P. Kumar (Co-PI)	2.5 Years (03/20-08/22) Sponsored by: ICFRE

	Fire in Uttarakhand and Madhya Pradesh	T. Thomas (Co-PI) L. N. Thakural P. K. Singh Rajesh Singh	Project Cost: Rs. 1.1033 Crore Status: In-progress
8.	Estimation of Sediment Load and GHG Emission from Reservoir of Chamara-I Power Station, NHPC	J.V. Tyagi R.P. Pandey Rajesh Singh (PI) M. K. Sharma	15 months (09/21-03/23) Project Cost: Rs. 3,24,500/- Sponsored by: CPWD Dehradun Status: In-progress

Proposed Training Programmes for 2022-23

SN	Topic	Duration	Place
1.	Water Quality: Concepts and Analysis under NHP for IRI officials (Coordinator: Dr. M. K. Sharma)	5 Days	Roorkee
2.	Estimation of Recharge for improving the Water Quality using MODFLOW & MT3D under NHP (Coordinator: Dr. M. K. Sharma)	5 Days	Roorkee
3.	Water Quality Assessment & Management under NHP-PDS (Coordinator: Dr. Rajesh Singh)	5 Days	Roorkee
4.	Water Quality Data Processing (Coordinator: Dr. Pradeep Kumar)	5 Days	Roorkee
5.	Leachate Transport in Groundwater under NHP-PDS (Coordinator: Ms. Anjali)	5 Days	Roorkee

GROUND WATER HYDROLOGY DIVISION

Approved Work Program for the year 2022-23

S. No.	Project	Project Team	Duration & Status	Funding Source
Internal Studies				
1. NIH/GWH/NIH/20-22	Integrated GEE-MODFLOW based Groundwater Recharge Assessment System for Hindon River System	Nitesh Patidar (PI), Gopal Krishan Anupma Sharma	2 years (08/20 – 07/22) <i>Status: In progress</i>	Internal Study
2. NIH/GWH/NIH/22-25	Studying arsenic genesis and developing alternate water supply management strategies in Ganga basin	Sumant Kumar (PI), S. Singh, R. Singh, G. Krishan, S. S. Rawat, M.K. Sharma, N. Patidar, P. K. Mishra, M. K. Goel	3 years (04/22 – 03/25) Status: New Study	Internal Study
3. NIH/GWH/NIH/22-24	Conjunctive Management of Water Resources in IGNP Command	Nitesh Patidar (PI), M. K. Goel, Anupma Sharma, Gopal	2 years (04/22 – 03/24)	Internal Study

		Krishan, Surjeet Singh, Sumant Kumar, Nidhi Kalyani	Status: New Study	
4. NIH/GWH/NIH /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) Status: New Study	Internal Study
Sponsored Projects				
5. NIH/GWH/BG S/17-20	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)	Gopal Krishan (PI), S. Singh, C. P. Kumar (retd.), M. S. Rao <i>BGS, UK:</i> Dan Lapworth Alan MacDonald Daren Goody	5 years (12/17-11/22) <i>Status: In progress</i>	BGS, UK
6. 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	Gopal Krishan (PI), Surjeet Singh, C. P. Kumar (Retd.), <i>IIT-Roorkee:</i> M. L. Kansal, Brijesh Yadav <i>Sehgal Foundation:</i> Lalit Mohan Sharma	4 years (12/17-07/22) <i>Status: In progress</i>	NHP under PDS
7. NIH/GWH/PD S/17-21	Ganges Aquifer Management in the Context of Monsoon Runoff Conservation for Sustainable River Ecosystem Services - A Pilot Study	Surjeet Singh (PI), C. P. Kumar, Sudhir Kumar, Suman Gurjar, Gopal Krishan	4 years (12/17-07/22) <i>Status: In progress</i>	NHP under PDS
8. NIH/GWH/CE HM/18-22	Integrated Management of Water Resources for Quantity and Quality in Upper Yamuna Basin up to Delhi	Anupma Sharma (PI) S. K. Jain, A. Sarkar, M. K. Sharma, L. N. Thakural, Sumant Kumar, P.K. Mishra, V. Singh, N. Patidar, N. Kalyani <i>Partners Haryana Irr. & WR Dept., UPGW Dept., UYRB, CWC</i>	4 years (04/18-01/24) <i>Status: In progress</i>	Special Project under “Centre of Excellence” (NHP)
9. 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), Gopal Krishan, Nitesh Patidar (<i>Lead: CAZRI Jodhpur, Partners: NIH Roorkee, IISWC</i>)	5 years (03/19 - 02/24) <i>Status: In progress</i>	DST

		Dehradun, CSWRI & CIAH, Bikaner, NIAM Jaipur)		
10. NIH/GWH/CC RBF/20-23	Expansion of the Indo-German Competence Centre for Riverbank Filtration – CCRBF	Gopal Krishan (PI & Co-coordinator)	3 years (07/20 – 06/23) <i>Status: In progress</i>	Federal Min. of Education and Research, Germany
11. NIH/GWH/DS T-SERB/21-24	Partitioning Evapotranspiration into Evaporation and Transpiration fluxes using Stable Isotopes of Oxygen and Hydrogen	Gopal Krishan (PI), MS Rao	3 years (04/21 – 03/24) <i>Status: In progress</i>	DST-SERB
12. NIH/GWH/AP N/22	Capacity Development Program on Site Suitability Mapping for Managed Aquifer Recharge (MAR) under Varying Climatic Conditions using Remote Sensing and Machine Learning based Hydrological Modelling Tools	Nitesh Patidar (PI), S. Singh, G. Krishan <i>IIT Roorkee(lead):</i> Basant Yadav, Ashish Pandey, R D Singh, B. J. Deka <i>In-kind support:</i> KU, Japan: Yutaka Matsuno, PNU, South Korea: Sanghyun Jeong	10 months (01/22-10/22) <i>Status: New Study</i>	Asia-Pacific Network (APN)
Consultancy Projects				
1.	Groundwater Investigations of Rana Sugars Ltd. Buttar Seviyan Area of Amritsar District, Punjab	Surjeet Singh (PI)	6 months (01/22 – 06/22) <i>Status: In progress</i>	NIT, Jalandhar (Punjab)

HYDROLOGICAL INVESTIGATIONS DIVISION

Approved Work Programme for the year 2022-23

S. N.	Project Title	Study Team	Duration	Status
<u>INTERNAL STUDIES:</u>				
1.	Assessment of dissolved radon concentration in groundwater of Uttarakhand	Hukam Singh (PI), M Someshwar Rao Soban Singh Rawat Vipin Agarwal	1 ¾ years (04/21-12/22)	Continuing Study
2.	Assessment of the Possible Impact of Climate Change on Evapotranspiration for Different Climatic Regions Of India	SD Khobragade (PI) Dr. Vishal Singh Sudhir Kumar	3 years (04/22-03/25)	New Study

S. N.	Project Title	Study Team	Duration	Status
3.	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)	New Study
4.	Studies for selected springs of Tehri Garhwal region, Uttarakhand	MS Rao (PI) and Team		Chairman suggested that instead of Tehri Garhwal, a proposal on study of springs of North-East region may be formulated.
<u>SPONSORED PROJECTS:</u>				
1.	Dating very old ground waters of deeper aquifers in Ganga Plains, India	M. Someshwar Rao (PI) Sudhir Kumar	3 Years (06/16 - 12/22)	Continuing Study IAEA under CRP
2.	Chemical & Isotopic Characterization of Deep Aquifer Groundwater of Middle Ganga Basin	Sudhir Kumar (PI) M. Someshwar Rao Vipin Aggarwal	3 ½ year (01/18 – 06/22)	Continuing Study NHP (PDS)
3.	Integrated Study on groundwater dynamics in the coastal aquifers of West Bengal for sustainable groundwater management	M. S. Rao (PI), Sudhir Kumar A. R. Senthil Kumar V. S. Jeyakanthan	3 ½ years (01/18-06/22)	Continuing Study NHP (PDS)
4.	Development of a comprehensive plan for conservation and sustainable management of Bhimtal and Naukuchiatal lakes, Uttarakhand	Suhas Khobragade (PI) Sudhir Kumar	3 years (01/18-06/22)	Continuing Study NHP (PDS)
5.	Groundwater Rejuvenation As Climate change Resilience for marginalized and gender sensitive Ganges (GRACERS)	Sudhir Kumar (PI) SM Pingale	2 years (06/19 – 09/22)	Continuing Study (IIT Bombay, Mumbai)
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	S S Rawat (PI) Sudhir Kumar P G Jose Suman Gurjar D S Bisht	4 Years 08/17)– 0922/)	Continuing Study NHP (PDS)

S. N.	Project Title	Study Team	Duration	Status
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	S S Rawat (PI) P G Jose Suman Gurjar D S Bisht	3 years (01/19-09/22)	Continuing Study (NMHS)
8.	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)	Continuing Study NHP (PDS) Transferred from EHD
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	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

Approved Work Programme for the year 2022-23

ONGOING STUDIES (SPONSORED)			
S. No. & Ref. Code	Title	Study Team	Duration
1. NIH/SWHD/ 19-23	Dam break studies of Kandaleru and Pulichintala dams in Andhra Pradesh (NHP)	P C Nayak Y.R.Satyaji Rao A.K. Lohani B. Venkatesh A. R. S. Senthil Kumar T. Thomas	3 year (Sept 2019 to April 2023)

ONGOING STUDIES (INTERNAL)			
S. No. & Ref. Code	Title	Study Team	Duration

1.NIH/SWHD /20- 22	Probabilistic dam break flood wave simulation and flood risk assessment for preparation of EAP for Mahi Bajaj Sagar dam in Rajasthan.	J.P. Patra Rakesh Kumar Pankaj Mani Sunil Gurrapu	2 years (July 2020 to August 2022)
2.NIH/SWHD /21-23	Uncertainty in rating curves and discharge estimation	Sanjay Kumar L. N. Thakural Sunil Gurrapu N.K. Bhatnagar J P Patra	2 Years (April 2021 to March 2023)

NEW STUDIES (INTERNAL)			
S. No. & Ref. Code	Title	Study Team	Duration
1.NIH/SWHD /22-22	Development of Cloud Data Based Integrated Framework to Forecast Flood for Efficient Operation of Reservoirs	A. K. Lohani, (PI) R. K. Jaiswal J. C. Patra P. C. Nayak Vishal Singh	Two Years April 2022 – March 2024
2.NIH/SWHD /22-23	Application of unified-extreme-value (UEV) distribution for flood frequency: selected rivers of U.S.A.	S.K. Singh	Six month (April 2022 to Sept. 2022)
3.NIH/SWHD /22-25	Application of unified-extreme-value (UEV) distribution for flood frequency: Comparison of results using GEV distribution	S.K. Singh	Six month (Oct. 2022 to March 2023)
4.NIH/SWHD /22-24	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)
5.NIH/SWHD /22-25	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 Patidaar N. K. Bhatnagar Jatin Malhotra Anil Kumar Chhangani	2 Year (July 2022 to June 2024)
6.NIH/SWHD /22-24	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)

7.NIH/SWHD /22-25	Climate change scenarios for Andhra Pradesh and its impact on streamflow and groundwater levels in Pennar River basin	Sunil Gurrapu Y R S Rao Nitesh Patidar R Venkat Raman	2 Year (April 2022 to March 2024)
8.NIH/SWHD /22-23	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)
9.NIH/SWHD /22-23	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	1.5 Year (May 2022 to Oct 2023)

WATER RESOURCES SYSTEMS DIVISION

Approved Work Programme for the year 2022-2023

SN	Title	Study Team	Duration	Funding (Rs. Lakhs)
Ongoing Sponsored/ Internal Studies				
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)	NMHS-MoEF (143)
2.	Assessment of seasonal variations in Hydrology and Cryosphere of upper Ganga Basin	Vishal Singh Sanjay K. Jain A P Dimri (JNU)	3 years (06/19-11/22)	NRDMS-DST (23.19)
3.	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 P K Agarwal	2 years (08/20-07/22)	NHP (14.50)
4.	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 (04/21-03/23)	NHP (9.00)
5.	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 Vanlalpekhluo Sailo (SDO from Mizoram); Lalruatkima (JE from Mizoram)	3 years (04/21-03/24)	NHP (25.00)

6.	Impacts of glacier and climate change on runoff for selected basins of Himalayan region	Vishal Singh Sanjay K. Jain Manohar Arora	2 years (08/20-07/22)	NIH (9.30)
7.	Monitoring and hydrological modeling of Henva watershed in Lesser Himalaya	M K Nema Sanjay K Jain P K Mishra P K Agarwal	3 years (08/20-07/23)	NIH (10.22)
8.	Seasonal Characterization of Gangotri Glacier melt runoff and simulation of streamflow variation under different climate scenarios	M. Arora P K Mishra Vishal Singh	3 years (04/21-03/23)	NIH
New Internal/ Sponsored Studies				
1.	Spatio-temporal Water Availability under Changing Climate and Landuse Scenarios in Wainganga River Basin	M K Nema P K Mishra	2 years (04/22-03/24)	NIH
2.	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, Dehradun (30.91)
3.	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	3 years (04/22-03/25)	WRD, Karnataka (54.0)

RESEARCH MANAGEMENT AND OUTREACH DIVISION (RMOD)

Approved Work Program for the year 2022-23

S N	Title of Project/Study	Funding	Study Team	Duration	Status
Internal Study					
1	Integrated assessment of water resources for sustainable use in Upper Dhasan basin in Bundelkhand region	NIH	Jyoti Patil (PI) T Thomas (Co-PI), P K Mishra Rohit Sambare	Sep 2020- Feb 2023	On-going
2	Establishing hydrologic regime and ecohydrological functions of Jhilmil Jheel wetland (Haridwar District, Uttarakhand)	NIH	Rohit Sambare (PI) V C Goyal (Co-PI), Sahas Khobragade, N R Allaka;	Sep 2020- Aug 2023	On-going

			Gajendra Singh-USAC, Dehradun; WI-SA, New Delhi; HESCO, Dehradun		
3	Hydrology-based scenario planning for water productivity and optimization of income from farming practices in Mewat region, Haryana	NIH	A R Senthil Kumar (PI) Omkar Singh (Co-PI) Rajesh Agarwal, N R Allaka Scientist from KVK/Agri Univ.	Sep 2020- Aug 2022	On-going
4	Development of Water Security Plan for Healthcare Facilities: A Pilot Study for Swami Rama Himalayan University (SRHU-HIHT), Jolly Grant, Dehradun	NIH	Omkar Singh (PI) V.C. Goyal, Rajesh Singh (Co-PI), Jyoti Patil, Rohit Sambare, N.R. Allaka; Team from SRHU-HIHT, Dehradun	April 2022- Mar 2024	New Study
Sponsored Projects					
1	Innovation Centre for Eco- Prudent Wastewater Solutions (IC-EcoWS)	DST (GoI)	V.C. Goyal (PI), Omkar Singh, Rajesh Singh, Jyoti P. Patil, Rohit Sambare, Project Team, HQ (IC- EcoWS) Partners: NIH, MNIT-Jaipur, IIT-Bombay, IRMA-Anand	Apr 2019- Mar 2024	On-going

Proposed Training/Webinar/Outreach Activities of RMOD (2022-23)

S.N.	Outreach Activity	Tentative Date & Month	Place	Target Participants	Team
1	Brainstorming session on 'Water Security in a Changing Environment- Focus on Indian Himalayan Region (IHR)', during 16th Uttarakhand Science and Technology Congress	June 2022	UCOST, Dehradun	Conference participants	V. C. Goyal, J P Patil, Amrendra Bhushan
2	5-days training on 'Life Cycle Approach for Rejuvenation of Ponds and Lakes using Nature-Based Solutions' sponsored by	April 2022 May 2022 June 2022 July 2022	Bhopal Belgaum Kakinada Roorkee	R&D Institutes/ University/ Govt. Organizations	Bhopal: T Thomas Belgavi: B Venkatesh Kakinada: YRS Rao Roorkee: J P Patil, Omkar Singh, Rohit Sambhare

	National Water Mission (4Nos)				
3	Training on GEM	June 2022	NIH Roorkee	Admn and finance staff of NIH	A. R. Senthil kumar Omkar Singh
4	Webinar on ecohydrological functioning of wetlands	Jul 2022	NIH Roorkee	Students and researchers	Rohit Sambare V C Goyal
5	Stakeholders workshop for Upper Dhasan Basin water resources assessment	May 2022	Bhopal	CWC, CGWB, State depts (Irrigation, WRD, Agril etc)	J P Patil, T Thomas, P K Mishra, Rohit Sambhare
6	Workshop/Webinar on rejuvenation of ponds and treatment of domestic wastewater through constructed wetlands	Jul 2022	NIH Roorkee	R&D Institutes/Univer sity/Govt. Organizations	NIH: Omkar Singh, V.C. Goyal, Rajesh Singh, Digambar Singh UKCEH: Laurence Carvalho & Elliot Hurst
7	Five-day training program on “Hydrology of water bodies and their development under climatic uncertainty”	Jun/Jul 2022	NIH Roorkee	Engineers in Irrigation/PHE/S WC departments	A. R. Senthil kumar, Rohit Sambare, Santosh M Pingale, N R Allaka
8	E-course on Urban hydrology	June 2022	NIH, Roorkee NIUA, Delhi	Researchers, academicians, scholars	NIH: V C. Goyal, J. P. Patil NIUA: Victor Shinde
9	Awareness Programme for School Children	July-Sep 2022	3 schools in Roorkee/ nearby	School Children	Digambar Singh, Omkar Singh, A. R. Senthil kumar, Rajesh Agarwal, N R Allaka

Other Outreach Activities:

S.N.	Activity
1	<ul style="list-style-type: none"> • Preparation of Short Video on Pond Rejuvenation & CW-NTS of Ibrahimur Masahi • River Walk of Solani River • Short video on Hydrology for People @district level • Short video on vulnerability assessment under Hydrology for People series
2	<ul style="list-style-type: none"> • Coordination of 75 planned Activities at HQ & RCs under Azadi Ka Amrut Mahotsav @ India 75 • Organizing activities as per mandate of Division under Azadi Ka Amrut Mahotsav @ India 75 • Compendium of NIH activities on the activities under Azadi Ka Amrut Mahotsav @ India 75
3	<ul style="list-style-type: none"> • Any other Outreach activity on demand/assigned

HARD ROCK REGIONAL CENTRE, BELAGAVI

Approved Work Program for the year 2022-23

S. N.	Project Title	Study Team	Duration	Status
<u>INTERNAL STUDIES:</u>				
1.	Monitoring and Evaluation of Ground Water Quality of Belagavi City, Karnataka, India	Varadarajan N (PI) Chandra Kumar S. Abhilash R	2 year (6/22 to 5/24)	New Study
<u>SPONSORED PROJECTS:</u>				
1.	Groundwater Model Development in Micro Basin of Hard Rock in Krishna And Godavari River Basins of Telangana	B Venkatesh (PI) M K Jose Sudhir Kumar Abhilash R & Officials form TSGWD	3 years (Sept 2019 –Aug 2022 Extended upto August 2023)	Special Studies under NHP
2.	Impact of Sand Mining On Groundwater Regime in Parts of Manjira River Basin, Telangana State	M K Jose (PI) B Venkatesh Chandramohan T. Abhilash R and Officials form TSGWD	2 years Sept 2021 – Aug 2023	Special Studies under NHP
3	Comprehensive Assessment of Water Availability, Use and Issues for Goa State	B Venkatesh, Chandramohan T. Abhilash R and Officials of WRD Goa	2 years (01/22 to 12/23)	Special Studies under NHP

WESTERN HIMALAYAN REGIONAL CENTRE, JAMMU

Approved Work program for the year 2022-23

S. No.	Title of Study	Team	Duration	Remarks
<u>Internal Studies</u>				
1.	Estimation of changes in snow cover and climate-cryosphere interaction in Upper Chenab river basin	P. G. Jose D. S. Bisht	02 Years 07 months (Aug. 2020 – Mar. 2023)	Ongoing, Extn. up to March 2023
2.	Mass balance of Phuche and Khardung glaciers, Ladakh with implications for downstream water availability under changing climate.	P. G. Jose D. S. Bisht D. Khurana	03 Years (July 2021- June 2024)	Ongoing

S. No.	Title of Study	Team	Duration	Remarks
3.	Investigation of hydrodynamic approach of flood inundation mapping along with assessment of changes in river planforms using a cloud-based Google Earth Engine (GEE) computing platform in data-scarce Western Himalayan basin	R. V. Kale D. Khurana	03 Years (Sept. 2021-July 2024)	Ongoing
4.	Early signatures of 21 st Century on snow cover dynamics in Zaskar river basin, Ladakh	D. S. Bisht P. G. Jose	02 Years (July 2021 - June 2023)	Ongoing
5.	Comparative analysis of fine-scale satellite & reanalysis precipitation products in Upper Ganga Basin using Multi-Criterion Decision-Making	D. S. Bisht M. K. Goel	01 Year (June 2022 – May 2023)	New Study
Externally funded R & D Studies				
1.	Web-enabled inventory of natural water springs of Tawi river catchment of J&K State of India for vulnerability analysis and developing adaptive measures for sustaining Tawi river	S. S. Rawat P. G. Jose S. Gurjar D. S. galkate	03 years (April March 2019 to 2022)	Ongoing study funded by NMHS (2 Co-PIs at WHRC)
2.	Operational coastal flood management through short-to-medium range 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)	Ongoing study funded under STARS by MHRD, GoI.
3.	Permafrost mapping and characterization of Western Himalayan Region	P. G. Jose A.P. Dimri (JNU) G. Jeelani (KU) V. Agnihotri (GBPNIHESD)	03 years (Aug 2019-Aug 2022)	Ongoing study funded under NMHS. PI vide letter dtd.10.2.2022

CENTRAL INDIA HYDROLOGY REGIONAL CENTRE, BHOPAL

Approved Work Program for the year 2022-23

S N	Title of Project/Study	Study Team	Duration	Status & Comments/ suggestions	Funding
Internal Studies					
1.	An experimental assessment of low-cost Auger Hole Technique	NIH R.V. Galkate R.K. Jaiswal MP-WALMI	2 years (Sept 2020 – August 2022)	Ongoing In-progress	Internal

	for accelerating groundwater recharge	Vivek Bhatt		in collaboration with WALMI Bhopal	
2.	Re-assessment of evapotranspiration (<i>ET_o</i>) estimation for irrigation planning in Madhya Pradesh	NIH R.V. Galkate R.K. Jaiswal A.K. Lohani Shashi Indwar MP-WRD, Bhopal Deepak Satpute Sayyam Jhanjari Sameer Soni	3 years (Nov 2021 – Oct 2024)	Ongoing In-progress in collaboration with BODHI, MPWRD Bhopal	Internal
3.	Water Availability Assessment for Project Formulation in Sub Basins of Ganga River in Madhya Pradesh	NIH R K Jaiswal, Ravi Galkate A K Lohani MP-WRD, Bhopal B Baghel	3 years (Nov 2021 – Oct 2024)	On-going	Internal
4.	Development of Reservoir Operation Plan under Climate Change scenarios for Kolar reservoir	NIH Shashi Indwar T. Thomas R. K. Jaiswal R.V. Galkate MP-WRD, Bhopal C.E, Hoshangaba, S.E Kolar E.E Kolar.	3 years (Oct 2021 – Sept 2024)	On-going	Internal
Sponsored Projects					
5.	Impacts of Upcoming Irrigation Projects and Climate Change on the Droughts and Desertification Scenario for Chambal Basin in Western Madhya Pradesh	NIH T. Thomas, B. Venkatesh R.V. Galkate Shashi Indwar R. K. Jaiswal P. C. Nayak Surjeet Singh MP-WRD, Bhopal Director Hydromet Mahesh Paliwal B. Baghel.	4 years (Dec 2017- July 2022)	Ongoing	PDS under NHP
6.	Integrated Assessment of the Impacts of Climate Change and Land-use Change on the Hydrology of the Narmada basin	NIH T. Thomas, B. Venkatesh P. C. Nayak Surjeet Singh	5 years (Feb 2018 – Sep 2023)	Ongoing	Special PDS under NHP

	through Hydrological Modelling Approaches	Shashi Indwar MP-WRD, Bhopal Director Hydromet Mahesh Paliwal, B. Baghel.			
7.	Hydrological Modeling for Evaluation of Return Flow and Irrigation Planning for Optimal Utilization of Water Resource in the Command of Sanjay Sagar Project in Madhya Pradesh	NIH R K Jaiswal Ravi Galkate T Thomas Shashi Indwar A K Lohani Sudheer Kumar Surjeet Singh MP-WRD, Bhopal Director, Hydromet, SE, GW circle, Database Admin, SE, EE, and AEs of Bah Project	4 years (Apr 2019 – Sept 2023)	Ongoing	PDS under NHP
8.	Development of Decision Tool for Efficient Utilization of Water Resource in Parbati Canal Irrigation Project of Rajasthan:	NIH R K Jaiswal, Ravi Galkate Shashi Indwar A K Lohani WRD Rajasthan Shailendra Kumar Sanjay Agrawal C B Garg	3 years (Apr 2019- March 2022) <i>(Granted Extension up to Sept 2022 by NPMU due to Corona reason)</i>	On-going	PDS under NHP
9.	Integrated reservoir operation studies for Mahanadi reservoir project complex in Chhattisgarh: SP-56/2021-22/NIH (CIHRC)	NIH R K Jaiswal, Ravi Galkate Shashi Indwar A. K. Lohani M. K. Goel, Vishal Singh Sumit Saini Dipti Rani WRD Chhattisgarh A. Verma, J. K. Das, V. K. Dubey A. Gupta, P. Awadhiya, IGKV Raipur S. Chandinah	2 years (Apr 2022-Mar 2024)	New Study	SP under NHP

DELTAIC REGIONAL CENTRE, KAKINADA

Approved Work Programme for the year 2022–23

S.No.	Title of the Project	Team	Duration (Start Date and End Date)	Funding
I. Internal Project (ongoing)				
1.	Identification of Recharge and Discharge areas of Palar river basin in Tamilnadu	V.S. Jeyakanthan (PI) J.V.Tyagi Sudhir Kumar Y.R.Satyaji Rao R.Venkata Ramana	2 years 09/21 - 03/23	Internal Funding (NIH)
Internal Study (New project)				
2	Impact assessment of backwater through drains, creeks and river mouths on groundwater salinity in the Godavari Delta, Andhra Pradesh	Y.R.Satyaji Rao (PI) Sudhir Kumar V.S.Jeyakanthan R.Venkata Ramana	2 years 08/22 - 08/24	Internal Funding (NIH)
II. Sponsored Projects (Ongoing)				
3	Urban hydrological studies of critical pilot area using of hydrological instruments in the Greater Hyderabad Municipal Corporation (GHMC) area Hyderabad	R. Venkata Ramana (PI) Y.R.Satyaji Rao V.S.Jeyakanthan T.Vijay	3 Years 01/20-04/23	NHP (PDS) (LA: I & CAD, Govt. of Telangana) TEL- 6_2017_2018
4.	High Performance Advanced Septic System for Villages and Roadside Restaurants	Y.R. Satyaji Rao (PI) T.Vijay	3 Years 04/18 – 12/22	IC – IMPACT Canada
III. Sponsored Project (New Project)				
5.	Quantification of SGD and its quality flux along the north coastal Andhra Pradesh	Y.R. Satyaji Rao (PI) Sudhir Kumar, S.M Pingale, M.K.Sharma R.Venkata Ramana	3 years (07/22 - 07/25)	Funded by NCESS, MoES

NORTH EASTERN REGIONAL CENTRE, GUWAHATI

Approved Work Programme for the year 2022-23

Sl. No.	Title	Study Group	Duration (Month/Year)	Study Type	Remarks
Internal Projects (On-going)					
1.	Linear Hydrological routing using Satellite precipitation datasets for flood forecasting in parts of Brahmaputra Basin	*Gulshan Tirkey, S. K. Sharma P. Mani	#3 years (4/18 to 3/21)	Internal	*PI to be Dr. S.K. Sharma #Study extended till 3/23
2.	Rainfall Induced Flood Hazard Risk Vulnerability Assessment in East Jaintia Hills, Meghalaya	*G. Tirkey, S. K. Sharma A. K. Lohani	#2 years (9/20-8/22)	Internal	*PI to be Dr. S.K. Sharma #Study extended till 3/23
Sponsored Projects (On-going)					
3.	River basin planning studies in Teesta basin up to confluence with Rangit River in Sikkim	S. Barman M.K. Goel A.K. Lohani D.S. Rathore Deepti Raani W.R. Singh	3 years (3/19 to 2/22)	Sponsored under NHP	On-going
4.	Study on Behaviors of Flooding and Unexpected Drought like Situations in Garo Hills District of Meghalaya	S. K. Sharma R.P. Pandey Gulshan Tirkey S.Barman W.R. Singh	3 years (10/19 to 9/22)	Sponsored under NHP	On-going
5.	A Coupled Hydrodynamic and Bank Dynamic Modeling Approach for Forensic Analysis of Bankline Erosion Process Along Majuli Island- the Largest Inhabited River Island in the World	S. Barman, R.K. Bhattacharya M.K. Dutta, W.R. Singh	3 Years (4/21-3/24)	Sponsored under DST-SERB Power grant	On-going
Internal Projects (New)					
6.	Impact of Climate Change on Flood Inundation in Beki River Basin	S.K. Sharma, S. Barman, W.R. Singh, S.V. Vijaya Kumar	1 years (7/22-6/23)	Internal	New-Study
7.	Drought characterization and vulnerability assessment in Assam	W.R. Singh, S. Barman,	2 years (7/22-6/24)	Internal	New-Study

		S.K. Sharma, S.V. Vijaya Kumar, A.K. Lohani			
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CENTRE FOR FLOOD MANAGEMENT STUDIES, PATNA

Approved Work Programme for the year 2022-2023

SI	Title	Study Team	Duration
Internal Studies			
1	Integrated Flood Management Plan for a stretch of Burhi Gandak River from Sikanderpur to Rosera	B Chakravorty(PI), Pankaj Mani and NG Pandey, Ex. Scientist	3 years (04/20-09/22)
2	Design flood estimation for small structures in the south Bihar area.	Pankaj Mani (PI), J. P. Patra B Chakravorty, I C Thakur, Director WALMI	2 years (04/21-11/22)
Sponsored Study (PDS/NHP)			
1.	Modeling and management of erosion and sedimentation processes in a reach of Gandak river using morphodynamic modeling	Pankaj Mani(PI) J. P. Patra B. Chakravorty & WRD Bihar	3 years (05/21-04/24)
New Study			
1.	Study of flood mitigation measures in Mahav nala using mathematical modelling study (New study)	Pankaj Mani (PI), J. P. Patra B Chakravorty with support from UP Irrigation Department and Forest Department (Maharajganj)	1 years (04/22-03/23)