APPROVED MINUTES OF

75th MEETING OFTECHNICAL ADVISORY COMMITTEE (TAC)

OF NATIONAL INSTITUTE OF HYDROLOGY

Held on 1 September 2021(VC mode)

The 75th meeting of the Technical Advisory Committee (TAC) of the National Institute of Hydrology, Roorkee was held in VC mode on 1 September2021. The meeting was chaired by Er. S. K. Haldar, 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, and then invited the Chairman for his opening remarks. At the outset, the Chairman in his opening remarks welcomed the participants. He appreciated the research being carried out by NIH and desired that the Institute should try to carry out research for sustainable development of water resources in India.

After a round of introduction, Dr. V. C. Goyal, Member-Secretary, delivered a brief presentation on the organizational set up and activities of NIH for the benefit of new members. He then took up the agenda items.

ITEM NO. 75.2: Confirmation of the Minutes of 74th Meeting of TAC

The Member-Secretary informed that minutes of the 74th meeting of TAC, held on Dec. 15, 2020, were circulated to all the members and invitees vide email dated Jan. 1, 2021. Since no comments were received from the members, the Minutes were confirmed by the TAC.

ITEM NO. 75.3: Action Taken on Decisions/Recommendations in the Previous Meeting

The Member-Secretary presented a table showing comments and suggestions of the members during the previous meeting. Regarding the study on discharge measurement in Himalayan basins, Director, NIH mentioned that a study on discharge estimation using non-contact hydrometric measurements is being carried out by Prof M K Jain at Department of Hydrology, IIT Roorkee, and may be referred to. During discussion on the second item, i.e. preparation of a Research Digest in Hydrology, Director, NIH mentioned about the manpower constraint as no Documentation Officer is presently available in NIH. Dr Sikka, Prof Arup Sarma, Shri Azad and others strongly advocated the need of a Documentation Officer in any research organization, and advised to request the GB of NIH to create the post of a Documentation Officer in NIH. In the meantime, a consultant may be hired to initiate the compilation of hydrologic research in India on an identified topic, such as the theme of World Water Day-2021 i.e. Valuing Water, or Impact of Climate Change on Water Resources as suggested by the Director, NIH.

ITEM NO. 75.4: Status of the Work Programme for the Year 2020-21

The Member-Secretary briefly mentioned about the studies carried out by the Institute during the year 2020-2021.He reported that twelve sponsored projects and fifteen internally funded 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 2020-2021 were presented during the meeting:
(i) Developments of Water Accounts for Subarnarekha Basin Using Water Accounting Plus (WA+) Framework (PI: Dr. P K Singh, Sc.D)
(ii) Real time flood modelling using HEC-RTS modelling framework (PI: Dr. Vishal Singh, Sc.C)

Dr Sikka appreciated the work carried out by NIH using WA+ Framework. Prof Arup Sarma suggested to improve land productivity and examine its impact on water productivity. Prof Jayakumar opined that NIH should popularise WA+ by carrying out research in different climatic zones of India, and publish results in reputed journals. Dr Sanjay Jain (NIH) informed that two more studies on WA+ have been taken up on the request of Meghalaya and Nagaland States.

Dr. Wani appreciated excellent suggestion from Prof Jayakumar, as it will be excellent input for IDEA (India Digital Ecosystem for Agriculture). NIH can lead this and its Regional Centres can be roped in for preparing for each State. For resources DST, DBT, Jal Shakti Ministry, MiEITY could be tapped. Also, Dr Suhas Wani advised to consult soil maps prepared by NBSSLUP, Nagpur, for WA+ studies.

Regarding the second study, the Chair advised to send the report of this study to CWC. Prof Arup Sarma mentioned that the forecasting uncertainties and associated risks should be verified with river cross-section data.

TAC noted the progress of the works of the Institute during the year 2020-2021.

ITEM NO. 75.5: Proceedings of the Working Group and Regional Coordination Committee (RCC)Meetings

The Member-Secretary briefly mentioned about the 51st meeting of the Working Group of NIH which was held in VC mode during 14-15 June 2021and 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 2020-2021 and recommended the work program for 2021-22.

Prof. Jayakumar advised NIH to consider Scopus Index while publishing research papers. Dr Sikka suggested dissemination of digital tools useful for hydrologists through social media. Prof Arup Sarma advised to widely disseminate short videos of success stories. Dr. Wani suggested tracking of research papers published by the scientists in different Divisions/Regional Centres. Also, he suggested compilation of a concept note on hydrological inputs as applicable to IDEA and make it available to various stakeholders, and on NIH website/portal.

ITEM NO. 75.6: Work Program for the year 2021-22

The Member-Secretary briefly mentioned about the proposed work programme of the Institute for the year 2021-22 which was discussed during the 51st Working Group meeting and various RCC meetings of NIH. The proposed work programme of the Institute for F.Y. 2021-22, 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 2021-22 (Annexure-II).

ITEM NO. 75.7: Major projects and activities of national importance

It was informed by the Member-Secretary that the following three major R&D projects are currently ongoing at NIH:

1. National Hydrology Project (NHP)- funded by The World Bank & GoI
2. National Mission for Sustaining the Himalayan Ecosystem (NMSHE)- funded by DST (GoI)
3. Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)- funded by DST (GoI)

ITEM NO. 75.8: Reporting Items

Details of the consultancy projects carried out by NIH during the year 2021-2022(up to August 2021) were noted by the TAC.

ITEM NO. 75.9: Additional items with the permission of the Chair

No such items were discussed.

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

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Annexure-I

LIST OF PARTICIPANTS INTHE 75thMEETING OF TAC OF NIH

1.	Er. S.K Haldar, Chairman, CWC	In-chair
2.	Smt. Poonam Sharma, CGWB	Rep. Chairman, CGWB
3.	Dr.J V Tyagi, Director, NIH	Member
4.	Dr. A K Das, IMD, New Delhi	Rep. DDGM(H)
5.	Sh. S K Manik, IMD, New Delhi	Rep. DDGM(H)
6.	Smt. Hemlata Bharwani, IMD, New Delhi	Rep. DDGM(H)
7.	Sh. Rahul Saxena, IMD, New Delhi	Rep. DDGM(H)
8.	Prof. K P Sudheer, IIT Madras	Member (Nominee of IITM)
9.	Prof. K V Jayakumar, NIT, Warangal	Member
10.	Dr. Suhas P Wani, Consultant, IRRI	Member
11.	Prof. M K Jain, IIT, Roorkee	Member (Nominee of IITR)
12.	Prof. Arup Sarma, IIT, Guwahati	Member
13.	Dr. Alok Sikka, IWMI, New Delhi	Member (Rep. IWMI India)
14.	Sh. Shambhu Azad, WAPCOS, New Delhi	Member (Rep. WAPCOS)
15.	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, GWHDivision, NIH, Roorkee
4. Dr. A K Lohani, Sc.G& Head SWH Division, NIH, Roorkee
5. Dr. R P Pandey, Sc. G & Head, EH Division, NIH, Roorkee
6. Sh. B. Chakraborty, Sc.G, CFMS, Patna
7. Sh. B. Ventkatesh, Sc.G, HRRC, Belgavi
8. Er. Omkar Singh, Sc.F, NIH, Roorkee
9. Dr. A R Senthil Kumar, Sc.F, NIH, Roorkee
10. Dr. Anupma Sharma, Sc.F, NIH, Roorkee
11. Dr. Surjeet Singh, Sc.F, NIH, Roorkee
12. Dr. P C Nayak, Sc.F, DRC, Kakinada
13. Dr. Chandra Mohan T., Sc.E, HRRC, Belgavi
14. Sh. N G Pandey, Sc.E, CFMS, Patna
15. Dr. S S Rawat, Sc.E, NIH, Roorkee
16. Dr. P G Jose, Sc.E, WHRC, Jammu
17. Dr. Manish Nema, Sc.D, NIH, Roorkee
18. Sh. J P Patra, Sc.D, NIH, Roorkee
19. Dr. Jyoti P. Patil, Sc.D, NIH, Roorkee
20. Dr. P K Singh, Sc.D, NIH, Roorkee
21. Dr. Sumant Kumar, Sc.D, NIH, Roorkee
22. Dr. S M Pingale, Sc.C, NIH, Roorkee
23. Dr. Sanjay Kumar Sharma, Sc. C, CFMS, Guwahati
24. Dr. Vishal Singh, Sc.C, NIH, Roorkee
25. Dr. Swapnali Barman, Sc.C, CFMS, Guwahati

Annexure-II

ENVIRONMENTAL HYDROLOGY DIVISION

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

SN	Study	Study Team	Duration/Status
Sponsored Projects (Ongoing)			
1.	Water Quality Assessment of Southwest Punjab Emphasizing Carcinogenic Contaminants and their Possible Remedial Measures	Rajesh Singh (PI) Pradeep Kumar, M. K. Sharma, Sumant Kumar **Partner:** Irrigation Department, Punjab	3 Years (09/17-08/21) **Sponsored by**: NHP-PDS **Status:** In-progress
2.	Leachate Transport Modeling for Gazipur landfill site for suggesting ameliorative measures	Anjali (PI) Sudhir Kumar, J. V. Tyagi M. K. Sharma **Partner:** CGWB (Delhi unit)	3 Years (11/2019 – 5/2023) **Sponsored by**: NHP-PDS **Status:** In-progress
3.	Water Efficient Irrigation by Using SCADA System For Medium Irrigation Project (Mip) Shahnehar	R.P. Pandey, (PI). Jagdeesh Patra, Rajesh Singh, N. K. Bhatnagar, Shekhar Saini	3-years (12/17-06/22) **Status:** In-progress
Sponsored Projects (New)			
4.	Isotopic and geochemical approach to study vulnerable confined and unconfided drinking water aquifers in Varanashi and surrounding area	Rajesh Singh (PI) R. P. Pandey BHU, Varanashi (Lead) Other Collaborators: BARC, Mumbai, ICER, Hungary	3 years 07/ 2021-07/24 **(proposed collaborative study)**
Internal Study (Ongoing)			
5.	Water quality assessment of Haridwar District	R.K. Nema (PI) Rajesh Singh, J. V. Tyagi, Pradeep Kumar	2 years (05/19-06/21) **Status:** completed
6.	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) **Status:** In-progress
7.	Development of rejuvenation plan for Hindon river system	M. K. Sharma (PI) Sudhir Kumar, R. P. Pandey, Anupma Sharma, Anjali, Vishal Singh, Pradeep Kumar, NiteshPatidar, Surjeet Singh, Rajesh Singh	3 Years (07/20-06/23) **Status:**In-progress
8.	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) **Status:** In-progress
Internal Studies (New Study)			
9.	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 (July 2021 – June 2024)

GROUND WATER HYDROLOGY DIVISION

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

SN	Title of Project/Study	Study Team	Duration	Status & Comments/ Suggestions	Funding
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, Suman Gurjar	Aug 2020-Jul 2022	On-going	Internal
Sponsored Projects					
2. NIH/GWH/BGS/17-20	Groundwater Fluctuations and Conductivity Monitoring in Punjab - New Evidence of Groundwater Dynamics in Punjab from High Frequency Groundwater Level and Salinity Measurements	Gopal Krishan (PI), Surjeet Singh, C. P. Kumar, M. S. Rao *From: BGS, UK* Dr. Dan Lapworth (PI) Prof. Alan MacDonald	Dec 2017-Nov 2021	On-going	Sponsored by BGS, UK
3. NIH/GWH/PDS/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, *IIT-Roorkee:*M. L. Kansal, Brijesh Yadav (PI) *Sehgal Foundation, Gurgaon:* Lalit Mohan Sharma	Dec 2017-Jul 2022	On-going	Sponsored by NHP under PDS
4. NIH/GWH/PDS/17-21	Ganges Aquifer Management in the Context of Monsoon Runoff Conservation for Sustainable River Ecosystem Services - A Pilot Study	Surjeet Singh (PI), M. K. Goel, Sudhir Kumar, Suman Gurjar, Gopal Krishan	Dec 2017-Jul 2022	On-going	Sponsored by NHP under PDS
5. NIH/GWH/DST/18-20	Future Secular Changes and Remediation of Groundwater Arsenic in the Ganga River Basin - FAR GANGA	B. Chakravorty (India Lead), Surjeet Singh (Dy. Lead), Sumant Kumar, Gopal Krishan, Suman Gurjar *Other India Partners:* IITR, IITKg, MCS, Patna *UK Partners:* Univ. of Manchester, BGS, Salford University, Univ. of Birmingham	Jan 2018-Dec 2021	On-going	DST-Newton Bhabha – NERC - India -UK Water Quality Research Programme
6. NIH/GWH/DST/18-20	Impact of Rainwater Harvesting on Groundwater Quality in India with Specific Reference to Fluoride and Micro-pollutants	Anupma Sharma (India Lead), Sumant Kumar, Gopal Krishan, Suman Gurjar, M. K. Sharma *Other Indian Partners:* IIT Ropar, IIT Jodhpur *UK Partner:* Cranfield University *Project Partners:* Water Harvest, Excellent Development (UK based NGOs)	Jan 2018-Dec 2021	On-going	DST-Newton Bhabha-NERC-India-UK Water Quality Research Programme

7. NIH/GWH/CEHM/18-22	Integrated Management of Water Resources for Quantity and Quality in Upper Yamuna Basin upto Delhi	Anupma Sharma (PI), Sanjay K. Jain, Archana Sarkar, M. K. Sharma, L. N. Thakural, Sumant Kumar, Suman Gurjar, Vishal Singh, Nitesh Patidar *Partner Organizations:* Irrigation & Water Resources Dept. Haryana, Groundwater Dept. UP, Yamuna Basin Organization, CWC, New Delhi	Apr 2018-Mar 2022	On-going	Special Project under "Centre of Excellence" (NHP)
8. NIH/GWH/DST/19-23	Enhancing Food and Water Security in Arid Region through Improved Understanding of Quantity, Quality and Management of Blue, Green and Grey Water	Anupma Sharma (Lead NIH), C. P. Kumar, Suman Gurjar, Nitesh Patidar (*Lead*: CAZRI Jodhpur, *Partners*: NIH Roorkee, IISWC Dehradun, CSWRI Bikaner, CIAH Bikaner, NIAM Jaipur)	Mar 2019-Feb 2024	On-going	Sponsored by DST
9. NIH/WRS/NMSHE/16-20	Development of a project website and hydrological database in Upper Ganga basin (SP-1)	M. K. Goel (PI), M. Arora, A. K. Lohani, D. S. Rathore, D. Chalisgaonkar, A. R. S. Kumar, Surjeet Singh, P. Mani, A. Sarkar, M. K. Nema, Suman Gurjar, P. K. Mishra	Jan 2016-Sep 2021	On-going	Sponsored by DST under NMSHE SP-1,
10. NIH/GWH/CCRBF/20-23	Expansion of the Indo-German Competence Centre for Riverbank Filtration – CCRBF	Gopal Krishan (PI & Coordinator)	Jul 2020-Jun 2023 ***Status: Approval is under consideration of MEA***	On-going	Sponsored by Federal Ministry of Education & Research, Germany

Training Courses Proposed

1	Four Training courses shall be organized by the Division during 2021-22 under the National Hydrology Project (NHP).

HYDROLOGICAL INVESTIGATIONS DIVISION

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

S. N.	Project Title	Study Team	Duration	Status
INTERNAL STUDIES				
1.	Hydrological investigations of selected springs in Tehri Garhwal District , Uttarakhand	S M Pingale (PI), Sudhir Kumar S. D. Khobragade Soban Singh Rawat Er. Padam Singh, (UUHF, Ranichauri) Rajeev Gupta	Apr 2019-Mar 2022	Continuing Study
2.	Assessment of impact of land use and land cover change on groundwater conditions in parts of Sabarmati river Basin, Gujarat	M. Someshwar Rao (PI) Sudhir Kumar Vipin Aggarwal	Apr 2021 – Mar 2023	***Revised New Study***
3.	Integrated Hydrological Investigations of Renuka lake, Himachal Pradesh, for its Conservation and Management	SD Khobragade (PI) Sudhir Kumar Hukam Singh Rajiv Gupta Vipin Agarwal Scientist from GoH.P.	Jul 2020-Jun 2023	Continuing Study
4.	Assessment of dissolved radon concentration in groundwater of Uttarakhand	Hukam Singh (PI), M Someshwar Rao, Soban Singh Rawat, Vipin Agarwal	Apr 2021-Dec 2022	New Study
SPONSORED PROJECTS				
1.	Understanding of hydrological processes in Upper Ganga basin by using isotopic techniques	Suhas Khobragade (PI) Sudhir Kumar, Rajesh Singh, M. Arora	Apr 2016 – Mar 2021 Extended upto Sep 2021	NMSHE Project
2.	Dating very old ground waters of deeper aquifers in Ganga Plains, India	M. Someshwar Rao (PI) Sudhir Kumar	Jun 2016 – Dec 2022	IAEA under CRP
3.	Chemical & Isotopic Characterization of Deep Aquifer Groundwater of Middle Ganga Basin	Sudhir Kumar (PI) M. Someshwar Rao Vipin Aggarwal	Jan 2018 – Jan 2022	NHP (PDS)
4.	Integrated Study on groundwater dynamics in the coastal aquifers of West Bengal for sustainable groundwater management	M. Someshwar Rao (PI), Sudhir Kumar A. R. Senthil Kumar V. S. Jeyakanthan	Jan 2018 – Jan 2022	NHP (PDS)
5.	Development of a comprehensive plan for conservation and sustainable management of Bhimtal and Naukuchiatal lakes, Uttarakhand	Suhas Khobragade (PI) Sudhir Kumar	Jan 2018 – June 2022	NHP (PDS)
6.	Unravelling Submarine Discharge (SGD) zones along the Indian subcontinent and its islands (Mission SGD) – Pilot Study	Sudhir Kumar (PI) SM Pingale, M. Someshwar Rao, BK Purandara, YRS Rao	Apr 2019 – Sep 2021	Study under NCESS, MoES

S. N.	Project Title	Study Team	Duration	Status
7.	Groundwater Rejuvenation As Climate change Resilience for marginalized and gender sensitive GangeS (GRACERS)	Sudhir Kumar (PI) M. Someshwar Rao SM Pingale	Jun 2019 – May 2022	(IIT Bombay, Mumbai)
8.	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	Aug 2017 – Mar 2022	NHP (PDS)
9.	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	Jan 2019– Dec 2021	NMHS

SURFACE WATER HYDROLOGY DIVISION

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

SN	Title of Project/Study	Study Team	Duration	Status & Comments	Funding
Ongoing Sponsored Studies					
1	Hydrological modelling in Alaknanda basin and assessment of climate change impact(NMSHE)	A.K.Lohani Sanjay K. Jain Archana Sarkar V.S. Jeyakanthan L.N. Thakural	5 years (April 2016 to September 2021)	On-going	DST
2	Rainfall-Runoff Modelling of Selected Basin based on LULC pattern and development of Correlation (NHP)	A.K. Lohani R.K. Jaiswal Sushant Jain WRD Rajasthan Sanjay Agarwal Shailendra Kumar	24 months (Oct. 2019 to April 2022)	On-going	NHP
Ongoing Internal Studies					
1	Assessment of Climate Change Impact on Water Availability and Agriculture in part of Banas basin	Archana Sarkar Surjeet Singh Suman Gurjar Sunil Gurrapu	2.5 years (Nov. 2018 August 2021).	On-going Extended upto August 2021	NIH
2	Evaluation of seasonal extreme rain events across river basins of India in 3D global temperature change scenario.	Ashwini Ranade Archana Sarkar	3 years (April 2018 to October 2021)	On-going Extended upto October 2021	NIH
3	Evaluation of the influence of low-frequency atmosphere-ocean oscillations on annual floods in the watersheds of the Indian subcontinent	Sunil Gurrapu Ashwini Ranade J.P. Patra	3 years (Nov 2018 to October 2021)	On-going	NIH
4	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	On-going	NIH

New Internal Studies					
1	Application of unified-extreme-value (UEV) distribution for flood frequency: (1) Mahi & Sabermati subzone – 3a (2) Godavari subzone-3e.	S.K. Singh	One year (April 2021 to March 2022)	New Study	NIH
2	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 Study	NIH

WATER RESOURCES SYSTEMS DIVISION

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

SN	Title of Project/Study	Study Team	Duration	Status & Comments	Funding
Sponsored Studies					
1.	Development of a project website and hydrological database in Upper Ganga Basin **(Sub-project – 1)**	M. K. Goel; M. Arora; A. K. Lohani; D. S. Rathore; D. Chalisgaonkar; A. R. S. Kumar; S. Singh; P. Mani; A. Sarkar; M. K. Nema; P. K. Mishra	5 years (01/16-03/21) (Extended till Sept., 2021)	On-going	DST
2.	Real-time snow cover information system for Upper Ganga basin **(Sub-project – 2)**	D. S. Rathore; (Now Deepa Chalisgaonkar is PI) V. S. Jeyakanthan; L. N. Thakural;	5 years (01/16-03/21) (Extended till Sept., 2021)	On-going	DST
3.	Glacial Lakes & Glacial Lake Outburst Flood (GLOF) in Western Himalayan Region **(Sub-project – 3)**	Sanjay K. Jain; A. K. Lohani; Sudhir Kumar; Praveen Thakur (IIRS)	5 years (01/16-03/21) (Extended till Sept., 2021)	On-going	DST
4.	Assessment of downstream impact of Gangotri glacier system at Dabrani and future runoff variations under climate change scenarios **(Sub-project – 4)**	~~Renoj J.Thayyen;~~ Sanjay K. Jain; Sharad K. Jain (Retd.) P. K. Mishra; M. Arora; AP Dimri (JNU)	5 years (01/16-03/21) (Extended till Sept., 2021)	On-going	DST
5.	Observation and modelling of various hydrological processes in a small watershed in Upper Ganga basin **(Sub-project – 5)**	M K Nema; Sharad K. Jain (Retd.); ~~Renoj J.Thayyen;~~ Sanjay K. Jain; P K Singh, P. K. Mishra; P. K. Agarwal AP Dimri (JNU)	5 years (01/16-03/21) (Extended till Sept., 2021)	On-going	DST

6.	Water Census and Hotspot analysis in selected villages in Upper Ganga basin **(Sub-project – 11)**	P. K. Mishra; M. K. Nema; ~~Renoj J. Thayyen;~~ Pradeep Kumar	5 years (01/16-03/21) (Extended till Sept., 2021)	On-going	DST
7.	Investigating Water Stress using Hydro-meteorological and Remote Sensing data	D. S. Rathore; (Now L. N. Thakural is PI); Sanjay Kumar; B. Venkatesh M. K. Jose; T. Chandramohan	3 years 2017-2020 (Extended upto June, 2021)	On-going	PDS under NHP
8.	Snow and glacier contribution and impact of climate change in Teesta river basin in Eastern Himalaya	Sanjay K. Jain P. K. Singh; M. Arora ~~Renoj J. Thayyen;~~ A. K. Lohani; Vishal Singh;	3 years (11/19-11/22)	On-going	NMHS-MoEF
9.	Assessment of seasonal variations in Hydrology and Cryosphere of upper Ganga Basin	~~Renoj J. Thayyen~~ Vishal Singh A. P. Dimri (JNU) Sanjay K. Jain	3 years (06/19-11/22)	On-going	NRDMS-DST
10.	Permafrost mapping and characterization of Ladakh Region	~~Renoj J. Thayyen;~~ A. P. Dimri (JNU) will lead now; G. Jeelani (KU); V. Agnihotri (GBPNI)	3 years (11/19-11/22)	On-going	NMHS-MoEF
11.	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)	On-going	NHP
12.	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; P K Agarwal	2 years (06/21-05/23)	**New**	NHP
13.	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)	2.5 years (06/21-05/24)	**New**	NHP
14.	Monitoring of Hydrological Processes in Glaciated and Non Glaciated Watersheds of North-West Himalaya	M K Nema; Sanjay K Jain; Manohar Arora; Vishal Singh; Praveen Thakur (IIRS)	3 years (07/21-06/24)	This study will be taken up after MOU is signed with IIRS.	IIRS

InternalStudies					
15.	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 (04/18-03/22)	On-going	NIH
16.	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)	On-going	NIH
17.	Monitoring and Hydrological Modelling of Henvel watershed in Lesser Himalaya (Phase II)	M K Nema; Sanjay K Jain; ~~Renoj J. Thayyen;~~ P K Mishra; P K Agarwal	3 years (08/20-07/23)	On-going	NIH
18.	Upgradation of NIH_ReSyP to .NET Platform– a Reservoir Operation Package	D. Chalisgaonkar M. K. Goel	1 year (08/20-07/21)	On-going	NIH

RESEARCH MANAGEMENT AND OUTREACH DIVISION (RMOD)

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

SN	Title of Project/Study	Study Team	Duration	Funding	Status
INTERNAL STUDY					
1	Conservation of ponds in Ibrahimpur- Masahi Village and performance evaluation of natural treatment system	NIH: Omkar Singh (PI) V C Goyal, Rajesh Singh, Digambar Singh, Subhash Kichlu, Rajesh Agrawal, Rakesh Goel, NR Allaka; CEH-UK: Prof. Laurence Carvalho & Team	Apr 2018-Jul 2021	NIH, CEH-UK	On-going
2	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	Jul 2020- Dec 2022	NIH	On-going
3	Establishing hydrologic regime and ecohydrological functions of Jhilmil Jheel wetland (Haridwar District, Uttarakhand)	Rohit Sambare (PI) V C Goyal (Co-PI), Suhas Khobragade; Gajendra Singh-USAC, Dehradun; WI-SA, New Delhi; HESCO, Dehradun	Jul 2020- Jun 2022	NIH	On-going
4	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.	Jul 2020- Jun 2022	NIH	On-going
SPONSORED PROJECTS					
1	Hydrological modelling in Bhagirathi basin up to Tehri dam and assessment of climate change impact	A R Senthil Kumar (PI) J. V. Tyagi, M. K. Goel, S. D. Khobragade, P. C. Nayak, Manohar Arora	Mar 2016-Mar 2021 (Extended upto Sep 2021)	DST-NMSHE	On-going

2	Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)	V.C. Goyal (PI), Omkar Singh, Rajesh Singh, Jyoti P. Patil, Rohit Sambare, Partners: NIH, MNIT-Jaipur, IIT-Bombay, IRMA-Anand	Apr 2019-Mar 2024	DST (GoI)	On-going
3	Preparation of Guidebook on S&T Interventions on Pond Rejuvenation	V C Goyal (PI), Jyoti Patil	Sep 2020- Jun 2021 (Ext. upto Dec 2021DST)	DST (GoI)	On-going

Proposed Training/Webinar/Outreach Activities of RMOD (2021-22)

S. N.	**Outreach Activity**	**Tentative Date & Month**	**Place**	**Target Participants**	**Team**
1	Webinar on "Water for Public Health (W4PH): Preparing for Disasters & Pandemics"	Jul 2021	Online mode	Medical and WASH professionals, water utility professionals, researchers	V C Goyal, Jyoti Patil, Varun Goyal, Amrendra Bhushan
2	Workshop/Webinar on rejuvenation of ponds and treatment of domestic wastewater through constructed wetlands	Sep 2021	NIH Roorkee	R&D Institutes/University/Govt. Organizations	NIH: Omkar Singh, V.C. Goyal, Rajesh Singh, Digambar Singh UKCEH: Laurence Carvalho & Elliot Hurst
3	Awareness Programme for School Children	July-Sep 2021	2 Schools in Roorkee/ Nearby	School Children	Digambar Singh, Omkar Singh, Subhash Kichlu, Rajesh Agarwal, N R Allaka
4	Awareness Programmes on "Water Conservation/Pond Rejuvenation" for Stakeholders in Ibrahimpur Masahi village/schools	Sep-Dec, 2021	Ibrahimpur Masahi/ schools	Villagers/ School children	Omkar Singh, V.C. Goyal, Rajesh Singh, Digambar Singh, Subhash Kichlu, Rajesh Agarwal, NR Allaka
5	Life cycle approach for rejuvenation of ponds and lakes using Nature Based Solutions (4 training courses of 5-days duration) Funded by NWM (MoJS, GoI)	Sep'21 – Jul '22	Roorkee/ Online	Field engineers and practitioners	Jyoti Patil, V C Goyal, Omkar Singh, Digambar Singh, Rohit Sambare, N R Alakka

Other Outreach Activities:

S.N.	**Activity**
1	• Preparation of Short Video on Pond Rejuvenation & CW-NTS of Ibrahimur Masahi
2	• Coordination of 75 planned Activities at HQ & RCs under Bharat Ka Amrut Mahotsav @ India 75 • Organizing activities as per mandate of Division under Bharat Ka Amrut Mahotsav @ India 75
3	• River Walk of Solani River (stretch to be identified)
4	• Any other Outreach activity on demand/assigned

HARD ROCK REGIONAL CENTRE, BELAGAVI

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

S. N.	Project Title	Study Team	Duration	Status
INTERNAL STUDIES:				
1.	Development of Prediction Tools for Assessment of Water Resources in Ungauged Catchments of West Flowing Rivers of Western Ghats Region	Chandramohan T (PI), Venkatesh.B., Chandrakumar. S., and officials from WRDO Karnataka	3 years April 2018-March 2021	An extension of 6 months, i.e., till September 2021 was recommended by the RCC.
2.	Climate Change Impact assessment for Jayakwadi Reservoir	B Venkatesh (PI), MK Jose, Chandrakumar, Ahilash and officers from WRD, Govt. Maharashtra)	3 years May 2018 – April 2021	An extension of 6 months, i.e., till September 2021 was recommended by the RCC.
3.	Flood Vulnerability Assessment and developing mitigation plan for Thiruvananthapuram City, Kerala	Chandramohan T (PI), Venkatesh.B., MK Jose and Chandrakumar.S	2 years (Sept 2019 – Aug 2021	An extension of 6 months, i.e., till September 2021 was recommended by the RCC.
4.	Impact Of Sand Mining On Groundwater Regime In Parts of Manjira River Basin, Telangana State	MK Jose(PI), B Venkatesh, Chandramohan, Abhilash and Officials form TSGWD	2 years Sept 2020 – Aug 2022	New Study
SPONSORED PROJECTS:				
1.	Estimation of Submarine Groundwater Discharge in Parts of Karnataka	BK Purandara(PI), Sudhir Kumar, JV Tyagi and N Varadarajan	Jan 2018 – March 2021 Extended till Sept 2021 by sponsoring authorities	Ongoing study sponsored by NCESS (MoES
2.	Groundwater Model Development In Micro Basin Of Hard Rock In Krishna And Godavari River Basins Of Telangana	B Venkatesh (PI), MK Jose, Sudhir Kumar, Abhilash & Officials form TSGWD	3 years (Sept 2019 – Aug 2022 Extended upto August 2023	NHP (PDS)

WESTERN HIMALAYAN REGIONAL CENTRE, JAMMU

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

S. No.	Title of Study	Team	Duration	Remarks
Internal Studies				
1.	Hydrologic and hydraulic modelling for floodplain inundation mapping under future climate change scenarios: A case study of Tawi River, India.	R. V. Kale P. G. Jose D. S. Bisht	03 years (August 2018 - March 2021)	Ongoing (Extended up to Sept. 2021)
2.	Statistical evaluation of global precipitation estimates over data scarce Western Himalayan Region of India	D. S. Bisht S. S. Rawat P. G. Jose	02 Years (Oct 2019 - Sept 2021)	Ongoing
3.	Estimation of changes in snow cover and glacier mass balance for Upper Chenab River Basin	P. G. Jose D. S. Bisht	02 Years (August 2020 - August 22)	Ongoing
4.	Mass and Energy Balances of Phuche and Khardung glaciers, Ladakh Range with implications for downstream water availability under changing climate.	P. G. Jose D. S. Bisht D. Khurana	03 Years (July 2021- June 2024)	New study
5.	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 D. Khurana	03 Years (September 2021-July 2024)	New study
6.	Early Signatures of 21st Century on Snow Cover Dynamics in Zanskar River Basin, Ladakh	D. S. Bisht P. G. Jose	01 Year (July 2021 - June 2022)	New study
Sponsored Projects				
1.	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 P. G. Jose S. Gurjar D. S. Bisht	03 years (April March 2019 to 2022)	Ongoing study funded by NMHS
2.	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)	Ongoing study funded under STARS by MHRD, GoI.
3.	Preparation of PRI based geo-referenced biodiversity assessment, documentation and conservation plan of wild flora and fauna of Kishtwar High Altitude National Park (KHANP) - Hydrology of streams and Land use and ecosystem resource mapping	P. G. Jose D. S. Bisht	02 years (July 2021- June 2023)	New study funded by UT of J&K

CENTRAL INDIA HYDROLOGY REGIONAL CENTRE, BHOPAL

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

SN	Title of Project/Study	Study Team	Duration	Status & Comments/ suggestions	Funding
Internal Studies					
1	An experimental assessment oflowcostAugerHoleTechniquefor accelerating ground waterrecharge	RaviGalkate R.K. Jaiswal Vivek Bhatt (WALMI)	Sep 2020- Aug 2023	On-going (In collaboration with WALMI Bhopal)	NIH-WALMI Bhopal
2	Impact Assessment Study atWALMI,BhopalDemonstrationFarm	R.K. Jaiswal Ravi Galkate VivekBhatt (WALMI) R. Thakur (WALMI)	Oct 2020- Jun 2021	On-going (In collaboration with WALMI Bhopal)	NIH
3	Re-assessment of evapotranspiration (*ETo*) estimation for irrigation planning in Madhya Pradesh	Ravi Galkate, R.K. Jaiswal, A.K. Lohani, Suhas Khobragade, Shashi Indwar Ex.Engg./Dy Dir, MPWRD	July 2021 – June 2023	New (In collaboration with MPWRD Bhopal)	NIH New study
4	Assessment of water yield in river basins of Madhya Pradesh	R.K. Jaiswal Ravi Galkate, A.K. Lohani, Shashi Indwar Ex.Engg./Dy Dir, MPWRD	July 2021 – June 2023	New (In collaboration with MPWRD Bhopal)	NIH New study
Sponsored Projects					
1	Evaluation of impact ofRabi irrigation in GangaRiversub- basin of MadhyaPradesh	R. V. Galkate R. K. Jaiswal, T. Thomas S.P. Indwar, MPWRD	Sep 2017-Sept. 2021	On-going (In collaboration with MPWRD Bhopal)	NHP-PDS
2	Impacts of Upcoming Irrigation Projects and Climate Changeon the Droughts and Desertification Scenario for Chambal Basin in Western MadhyaPradesh	T. Thomas P.C. Nayak, Surjeet Singh, B. Venkatesh, R.V. Galkate, R. K. Jaiswal, S. P. Indwar	Dec 2017- Nov 2021	On-going (In collaboration with MPWRD Bhopal)	NHP-PDS
3	IntegratedAssessment ofthe Impacts of ClimateChange and Land useChangeon the Hydrology of theNarmadabasin through Hydrological Modelling Approaches	T. Thomas S. Singh, B. Venkatesh P. C. Nayak, A. Sarkar, Manish Nema, P. Mishra, S. P. Indwar	Feb 2018- Jan 2023	On-going (In collaboration with MPWRD Bhopal)	NHP-PDS

4	Hydrological Modeling for Evaluation of Return Flow and Irrigation Planning for Optimal Utilization of WaterResourcein the Command ofSanjay Sagar Project in MadhyaPradesh	R. K. Jaiswal R. V. Galkate T. Thomas Shashi Indwar. A. K. Lohani, Sudhir Kumar, Surjeet Singh, MPWRD	April 2019- Mar 2023	On-going (In collaboration with MPWRD Bhopal)	NHP-PDS
5	Development of Decision Tool forEfficient Utilization ofWater Resourcein ParbatiCanal & DholpurPiped IrrigationProject of Rajasthan	R. K.Jaiswal R. V. Galkate, A. K. Lohani, ShashiIndwar, RJWRD	April 2019- Mar 2022	On-going (In collaboration with RJWRD Jaipur)	NHP-PDS

DELTAIC REGIONAL CENTRE, KAKINADA

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

S. No	Title of the Project	Team	Start date and End date	Funding
Internal Study				
1.	Identification of Recharge and Discharge areas of Palar basin in Tamilnadu	V.S.Jeyakanthan (PI) J.V. Tyagi Sudhir Kumar, Y.R.Satyaji Rao, S. Raja	September 2021 to -March 2023	Internal Funding (NIH)
Sponsored Projects				
1	Groundwater salinity source identification in Godavari delta, Andhra Pradesh	Y.R.Satyaji Rao (PI) T.Vijay, Sudhir Kumar R.VenkataRamana Gopal Krishana S.V.Vijaya Kumar	March 2018 to October 2021	NHP(PDS) (LA: DRC, NIH) (SP-28/2017-2018/PDS-13)
2	Study of the behaviour of Multi-Aquifer system & Aquifer mapping for an effective Groundwater Management in Gunderu Sub-Basin, West Godavari district, AP	S.V.Vijaya Kumar (PI) Anupama Sharma Y.R.Satyaji Rao T.Vijay Sudhir Kumar J.V.Tyagi	August 2018 to March 2022	NHP(PDS) (LA:AP State GW&WA Dept.,) AP_1_2017_80
3	Dam break studies of Kandaleru and Pulichintala dams in Andhra Pradesh	P.C.Nayak (PI) Y.R.Satyaji Rao A.K. Lohani B. Venkatesh A. R. S. Senthil Kumar T. Thomas	April 2019 to March 2022	NHP(PDS). (LA: DRC, NIH) SP-43/2019-21/1

4	Urban hydrological studies of critical pilot area using of hydrological instruments in the Greater Hyderabad Municipal Corporation (GHMC) area Hyderabad.	R.VenkataRamana (PI) Y.R.Satyaji Rao V.S.Jeyakanthan T.Vijay	January 2020 to April 2023	NHP(PDS) (LA: Hydrology and Investigations, I & CAD, Govt.,Telengana) TEL-6_2017_86
5	High Performance Advanced Septic System for Villages and Roadside Restaurants	Y.R Satyaji Rao (PI) T.Vijay	April 2018 to March 2022	IC-IMPACT, Canada
6	Unravelling Submarine Groundwater Discharge (SGD) Zones along A.P and Odisha States (Mission SGD)-Pilot Study	Y.R. Satyaji Rao (PI) T.Vijay	April 2019 to September 2021	MoES,Govt., of India.

CENTRE FOR FLOOD MANAGEMENT STUDIES, GUWAHATI

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

Sl. No.	Title	Study Group	Duration (Month/Year)	Study Type	Remarks
Internal Studies					
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	On-going (Er Gulshan Turkey is on long medical leave.)
2.	Impact of Climate Change on Runoff and Sediment Yield for a Major Tributary of River Brahmaputra	Swapnali Barman, J.V. Tyagi, R.K. Bhattacharya, W Rahul Singh	3 years (11/18 to 12/21)	Internal	On-going
3.	Groundwater Quality Assessment of Morigaon district of Assam with emphasis on Arsenic & Fluoride Contamination	S.K. Sharma Rajesh Singh G. Tirkey W Rahul Singh	2 years (7/19 to 6/22)	Internal	On-going
4.	Hydrological Behaviour of two mid-sized Mountainous Catchments under the influence of Climate and Land Use Changes	W Rahul Singh , A.K .Lohani, A. Bandyopahdyay Swapnali Barman Nitesh Patidar	3 years (7/19-6/22)	Internal	On-going
5.	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	On-going
Sponsored Projects					
6.	River basin planning studies in Teesta basin up to confluence with Rangit River in Sikkim	Swapnali 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

7.	Study on Behaviors of Flooding and Unexpected Drought like Situations in Garo Hills District of Meghalaya	S. K. Sharma R.P. Pandey GulshanTirkey Swapnali Barman W.R. Singh	3 years (10/19 to 9/22)	Sponsored under NHP	On-going
8.	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	Swapnali Barman, R.K. Bhattacharya M.K. Dutta, W.R. Singh	3 Years (4/21-3/24)	Sponsored under DST-SERB Power grant	New Study

CENTRE FOR FLOOD MANAGEMENT STUDIES, PATNA

APPROVED WORK PROGRAMME FOR THE YEAR 2021-22

Sl	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	2 years (04/20-03/22)
2	Performance evaluation of Upper Morhor Canal System of South Bihar	NG Pandey(PI) B Chakravorty	2 years (04/20-03/22).
3	Design flood estimation for small structures in the south Bihar area.	Pankaj Mani (PI), B Chakravorty, I C Thakur, Director WALMI	1 years (04/21-03/22)
Sponsored Project (PDS/NHP)			
4.*	Modelling and management of erosion and sedimentation processes in alluvial river using morphodynamic modeling*	Pankaj Mani(PI) J. P. Patra B. Chakravorty & WRD Bihar	New study proposed under PDS (05/21-04/24)

**This study was started as an internal study in April, 2019. The proposal of this study was submitted to NHP as PDS. This study has been approved as PDS in Feb. 2021 with duration of 3 years from May, 2021 to Apr 2024 and therefore now this study has been taken up as PDS.*