

**APPROVED MINUTES OF THE 72<sup>nd</sup> MEETING OF  
TECHNICAL ADVISORY COMMITTEE OF  
NATIONAL INSTITUTE OF HYDROLOGY  
Held on 3 June 2019 at New Delhi**

The 72<sup>nd</sup> meeting of the Technical Advisory Committee (TAC) of the National Institute of Hydrology, Roorkee was held in the Central Water Commission, New Delhi on 3 June 2019. The meeting was chaired by Er. S Masood Husain, Chairman, CWC. The list of the participants is given in Appendix -I.

At the outset, the Chairman in his opening remarks, welcomed the members and the invitees. He appreciated the research being carried out by NIH, and desired that the Institute should try to align the research outcome with the activities of the Ministry of WR, RD & GR and the overall water sector in India. After a round of introduction, general comments and suggestions made by the TAC members on the working of NIH are as follows:

Er Masood Husain, Chairman, CWC	<ol style="list-style-type: none"> <li>1. TAC should meet twice a year, once in Delhi and once at Roorkee</li> <li>2. Prepare a note on how outcome of research at NIH has been utilized</li> <li>3. NIH to consider replication of the study on water efficiency using SCADA in other projects</li> <li>4. Project/study duration of 5 years is too long- please consider</li> <li>5. Next meeting of TAC may be held on 17 Dec 2019 (AN) at Roorkee</li> </ol>
Er N K Mathur, Member (D&R),CWC	<ol style="list-style-type: none"> <li>1. Path breaking studies of NIH to be reviewed by experts</li> <li>2. Strengthen hydromet manpower at NIH</li> <li>3. Similar studies are being taken up by different divisions of NIH. This may be addressed</li> <li>4. SWAT results should be validated at sub-basin level</li> </ol>
Prof. K V Jayakumar NIT-Warangal	<ol style="list-style-type: none"> <li>1. Can NIH bring out a compilation of studies using SWAT model?</li> </ol>
Prof. K P Sudheer, KSCST	<ol style="list-style-type: none"> <li>1. Total budget of consultancy projects on yearly basis may be indicated</li> </ol>
Dr Suhas P Wani, IRRI	<ol style="list-style-type: none"> <li>1. Status of ongoing studies should be mentioned in the table in bullet form</li> <li>2. NIH should plan integrated projects in identified high priority areas with involvement of scientists from different Divisions/RCs</li> </ol>
Dr. Himanshu Kulkarni, ACWDAM, Pune	<ol style="list-style-type: none"> <li>1. Draft report of spring related studies may be sent to ACWDAM, Pune for suggestions/comments</li> <li>2. Bring out summary of projects and studies</li> <li>3. Design training courses based on research studies at NIH</li> </ol>
Ms Bharti Gupta, NHPC	<ol style="list-style-type: none"> <li>1. NIH publications may be made available online</li> </ol>

Dr V C Goyal, Member-Secretary, also welcomed the Chairman, members and invitees. A brief presentation on the organizational set up and activities of NIH was made for benefit of the new members. He then took up the agenda items.

#### **ITEM NO. 72.2: Confirmation of the Minutes of 71<sup>st</sup> Meeting of TAC**

The Member-Secretary informed that minutes of the 71<sup>st</sup> meeting of TAC, held on April 23, 2018, were circulated to all the members and invitees vide email dated May 24, 2018. Since no comments were received from the members, the Minutes were confirmed by the TAC.

#### **ITEM NO. 72.3: 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. He informed that the suggestions offered during the previous meeting have been noted for compliance, and actions initiated accordingly.

#### **ITEM NO. 72.4: Status of the Work Programme for the Year 2018-19**

The Member-Secretary briefed about the studies carried out by the Institute during the year 2018-2019. 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 2018-19 were presented during the meeting:

- i. River shifting analysis and flow modelling study of Ganga river from Rishikesh to Anupshahar ( Dr. Pankaj Mani, CFMS-Patna)
- ii. Hydrological investigation of natural water springs of Baan Ganga watershed in J&K State (Dr. S S Rawat, RC Jammu)

On the study 'Development and regionalization of unit hydrograph for runoff modeling on Indian catchments' under SWH Division, the Chairman wanted to know if any innovative work is being carried out, and desired that the report and published papers (if any) on this study may be sent to CWC. Er N K Mathur (CWC) advised to link the study on 'Snow cover variability in the Upper Yamuna basin' with water availability. TAC noted the status of work programme for the year 2018-19.

#### **ITEM NO. 71.5: Report Proceedings of the Working Group and RCC Meetings**

The Member-Secretary briefed about the 47<sup>th</sup> and 48<sup>th</sup> meetings of the Working Group of NIH, which was held at NIH, Roorkee, during 23-24 Oct. 2018 & 2-3 May, 2019, 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 2018-19 and recommended the proposed work programme for the year 2019-20.

The Chairman desired that salient recommendations of these meetings should be presented in bullet points for each Division/RC. TAC noted the proceedings of the Working Group and RCC meetings.

### **ITEM NO. 72.6: Work Programme for the Year 2019-20**

The Member-Secretary briefed about the proposed work programme of the Institute for the year 2019-20, which was discussed during the 48<sup>th</sup> Working Group meeting of NIH. The proposed work programme of the Regional Centres, as recommended by the respective RCCs, was also placed before the TAC. TAC advised NIH to organize training courses based on the research studies, such as (1) Environmental flow assessment, and (2) Water and environment OR hydrological issues related to environment.

TAC approved the work programme of the Institute for the year 2019-20 (Appendix-II).

### **ITEM NO. 72.7: Major projects and activities of national importance**

#### **(i) Roorkee water Conclave-2020**

National Institute of Hydrology Roorkee (NIH) and Indian Institute of Technology Roorkee (IITR) jointly decided to organize regular international conference every 2 years in the area of various facets of water, to be known as “Roorkee Water Conclave”. The first Roorkee Water Conclave will be organized during 26-28 February, 2020 at Roorkee broadly focusing on “Hydrological Aspects of Climate Change”. Detailed information about the conference is available on the conference website (<https://www.iitr.ac.in/rwc2020/index.html>) as well as [www.nihroorkee.gov.in](http://www.nihroorkee.gov.in) .

#### **(ii) 6th National Water Symposium**

The sixth National Water Symposium (in Hindi) is scheduled to be organized at NIH Roorkee during 16-17 December 2019. The focal theme of the symposium is “Water and Environment”. The symposium is expected to provide a platform to the researchers and stakeholders to share their researches, experiences and innovative practices in Hindi. Detailed information about the symposium is available on NIH website [www.nihroorkee.gov.in](http://www.nihroorkee.gov.in) .

TAC approved the proposal to organize the above two events.

### **ITEM NO. 72.8: Reporting Items**

Details of the consultancy projects carried out by NIH during the year 2018-2019 were noted by the TAC. TAC advised that the total budget of consultancy projects in NIH on yearly basis may be indicated.

### **ITEM NO. 72.9: Additional items with permission of the Chair**

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

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**LIST OF PARTICIPANTS IN THE 72<sup>nd</sup> MEETING OF TAC OF NIH**

1.	Er S Masood Husain, Chairman, CWC, New Delhi	In-chair
2.	Er N K Mathur, Member (D&R), CWC, New Delhi	Member
3.	Dr Sharad K Jain, Director, NIH, Roorkee	Member
4.	Dr Poonam Sharma, CGWB, New Delhi	Rep. Chairman, CGWB
5.	Dr A K Das, IMD, New Delhi	Rep. DDG(H)
6.	Prof M K Jain, IIT-Roorkee	Rep. IIT Roorkee
7.	Prof K V Jayakumar, NIT-Warangal	Member
8.	Prof. K P Sudheer, IIT-Madras	Member
9.	Dr Suhas P Wani, IIRRI	Member
10.	Dr. Himanshu Kulkarni, ACWDAM, Pune	Member
11.	Ms. Bharti Gupta, NHPC, Faridabad	Rep. of NHPC
12.	Sh. Shambhu Azad, WAPCOS, New Delhi	Rep. of WAPCOS
13.	Mr. Guy Broucke and Ms. Neha Midha	Rep. of UNESCO
14.	Dr V C Goyal, Sc. G, NIH, Roorkee	Member-Secretary

**INVITEES**

1. Director (R&D), MoWR, New Delhi
2. Dr Rakesh Kumar, Sc. G & Head, SWH Division, NIH, Roorkee
3. Dr J V Tyagi, Sc. G & Head, EH Division, NIH, Roorkee
4. Dr Sudhir Kumar, Sc. G & Head, HI Division, NIH, Roorkee
5. Dr Sanjay Jain, Sc. G & Head, WRS Division, NIH, Roorkee
6. Dr M K Goel, Sc. G, NIH, Roorkee
7. Dr S S Rawat, Sc.D, NIH-RC, Jammu
8. Dr Pankaj Mani, Sc.D, NIH-RC, Patna
9. Dr Pradeep Kumar, Sc. C, NIH, Roorkee
10. Dr Jyoti P. Patil, Sc. C, NIH, LCU-Delhi

## APPROVED WORK PROGRAMME FOR THE YEAR 2019-20

## ENVIRONMENTAL HYDROLOGY DIVISION

## Work Program for the Year 2019-20

SN	Study	Study Team	Duration/Status
<b>Internal Studies (Continuing)</b>			
1.	Development of Habitat Suitability Curves for the Aquatic Species of Western Himalayan Streams and Assessment of Environmental Flows	Pradeep Kumar (PI)	3 Years (04/16-07/19)
<b>Internal Studies (New)</b>			
2.	Water Quality Assessment of Haridwar District	R.K. Nema (PI) Rajesh Singh, J. V. Tyagi Pradeep Kumar	3 years (05/19-04/22)
<b>Sponsored Projects (Continuing)</b>			
3.	Environmental Assessment of Aquatic Ecosystem of Upper Ganga Basin	M. K. Sharma (PI) Manohar Arora, Pradeep Kumar, Rajesh Singh D. S. Malik (GKU)	5 Years (04/16-03/21) Sponsored by: DST (NMSHE)
4.	Ground Water Quality Assessment with Special Reference to Sulphate Contamination in Bemetara District of Chhattisgarh State and Ameliorative Measures	M. K. Sharma (PI) Surjeet Singh, Pradeep Kumar <b>Partner:</b> WRD, Raipur, CGWB, Raipur	3 Years (09/17-08/20) Sponsored by: NHP-PDS Project Cost: Rs. 25.4 Lakh Status: In-progress
5.	Water Quality Assessment of Southwest Punjab Emphasizing Carcinogenic Contaminants and their Possible Remedial Measures	Rajesh Singh (PI) Pradeep Kumar M. K. Sharma Sumant Kumar <b>Partner:</b> Water Resources Organisation, Punjab	3 Years (09/17-08/20) Sponsored by: NHP-PDS Project Cost: Rs. 65.6 Lakh Status: In-progress
<b>Sponsored Projects (New)</b>			
6.	Leachate Transport Modeling for Gazipur landfill site for suggesting ameliorative measures	Anjali (PI) Sudhir Kumar J. V. Tyagi M. K. Sharma Nitesh Patidar <b>Partner:</b> CGWB (Delhi unit)	3 Years Project cost: Rs. 76.10 Lakh Status: PDS proposal submitted to NHP, yet to be approved by Review committee
7.	Study of Emerging Pollutants and Geochemical Processes Responsible for the Groundwater Contamination in and around Raipur Agglomerate, Chhattisgarh and Suggestive Ameliorative Measures	M. K. Sharma (PI) J. V. Tyagi Surjeet Singh Pradeep Kumar Rajesh Singh WRD, Raipur	3 Years Project cost: Rs. 77.32 Lakh Status: PDS proposal submitted to NHP, yet to be approved

## Training Programmes During 2019-20

SN	Topic	Duration	Place
1.	Hydrologic Modelling using SWAT (Coordinator: Dr. J. V. Tyagi)	Two weeks 20-31 May 2019	Roorkee

2.	Ground Water Quality Monitoring & Assessment under NHP-PDS (Coordinator: Dr. M. K. Sharma)	5 Days 3-7 June 2019	Roorkee
3.	Water Quality Assessment & Management under NHP-PDS (Coordinator: Dr. Rajesh Singh)	5 Days 17-21 June 2019	Roorkee
4.	Water Quality: Concepts and Analysis under NHP (Coordinator: Dr. Pradeep Kumar)	5 Days Oct. 2019	Roorkee

**GROUND WATER HYDROLOGY DIVISION  
Work Program for the Year 2019-20**

S. No.	Project	Project Team	Duration & Status	Funding Source
<b>Internal Studies</b>				
1. NIH/GWH/ NIH/19-21	Application of Satellite Data Products for Water Resources Assessment	Suman Gurjar (PI), Vishal Singh, Surjeet Singh, C. P. Kumar, P. K. Singh	2 years (05/19 - 04/21) <i>Status: In progress</i>	Internal Study
<b>Sponsored Projects</b>				
2. NIH/GWH/ NIH/15-19	Peya Jal Suraksha - Development of Six Pilot Riverbank Filtration Demonstrating Schemes in Different Hydrogeological Settings for Sustainable Drinking Water Supply	Surjeet Singh (Lead), B. Chakravorty, Y. R. S. Rao, Anupma Sharma, Sumant Kumar, Gopal Krishan, Suman Gurjar, Anju Chaudhary, Sanjay Mittal	2.5 years (11/15-12/19) Extended till Dec. 2019 <i>Status: In progress</i>	Sponsored by MoWR, RD & GR under Plan Fund
3. NIH/GWH/ NMSHE/16 -20	Study of River - Aquifer Interactions and Groundwater Potential at Selected Sites in the Upper Ganga Basin up to Dabrani	Surjeet Singh (PI), C. P. Kumar, R. J. Thayyen, Sudhir Kumar, Manohar Arora, Gopal Krishan, Nitesh Patidar, Anjali	5 years (01/16 - 12/20) <i>Status: In progress</i>	Sponsored by DST under NMSHE SP-8
4. 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  <i>From: BGS, UK</i> Dr. Dan Lapworth (PI) Prof. Alan MacDonald	3 years (12/17-11/20) <i>Status: In progress</i>	Sponsored by BGS, UK
5. NIH/GWH/ PDS/17- 20	Hydro-geochemical Evolution and Arsenic Occurrence in Aquifer of Central Ganges Basin	Sumant Kumar (PI), Sudhir Kumar, Rajesh Singh, Gopal Krishan, Anju Chaudhary <i>Partner Organization:</i> MWRD, Bihar <i>Collaborator:</i> Brijesh Yadav, IIT Roorkee and N.S Maurya, NIT Patna	3 years (12/17-11/20) <i>Status: In progress</i>	Sponsored by NHP under PDS

6. 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, S. K. Verma <i>IIT-Roorkee:</i> M. L. Kansal, Brijesh Yadav (PI) <i>Sehgal Foundation,</i> <i>Gurgaon:</i> Lalit Mohan Sharma	3 years (12/17-11/21) <i>Status: In progress</i>	Sponsored by NHP under PDS
7. 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), C. P. Kumar, Sudhir Kumar, Suman Gurjar, Gopal Krishan	4 years (12/17-11/21) <i>Status: In progress</i>	Sponsored by NHP under PDS
8. 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 <i>Other India Partners:</i> IITR, IITKg, MCS, Patna <i>UK Partners:</i> Univ. of Manchester, BGS, Salford University, Univ. of Birmingham	3 years (01/18 - 12/20) <i>Status: In progress</i>	DST-Newton Bhabha- NERC- India- UK Water Quality Research Programme
9. NIH/GWH/ DST/18-20	Impact of Rainwater Harvesting on Groundwater Quality in India with Specific Reference to Fluoride and Micro-pollutants	Anupma Sharma (Indian Lead), Sumant Kumar, Gopal Krishan, Suman Gurjar, M. K. Sharma <i>Other Indian Partners:</i> IIT Ropar, IIT Jodhpur <i>UK Partner:</i> Cranfield University School of Water, Energy and Environment; Cranfield University <i>Project Partners:</i> Wells for India and Excellent Development, UK based NGOs together with their Indian offices and local NGO partners in Rajasthan	3 years (01/18 - 12/20) <i>Status: In progress</i>	DST-Newton Bhabha- NERC- India- UK Water Quality Research Programme
10. NIH/GWH/ CEHM/18- 22	Integrated Management of Water Resources for Quantity and Quality in Upper Yamuna Basin up to Delhi.	Anupma Sharma (PI) Sanjay K. Jain, Archana Sarkar, M. K. Sharma, L. N. Thakural, Sumant Kumar, Suman Gurjar, Vishal Singh, Nitesh Patidar <i>Partner Organization:</i> C.E, IWRD Haryana, Tech. Coord., GWD UP, S.E. YBO, CWC New Delhi	4 years (04/18-03/22) <i>Status: In progress</i>	Special Project under “Centre of Excellence” (NHP)

11. 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), Nitesh Patidar  (Lead: CAZRI Jodhpur, Partner: NIH)	4 years (03/19 - 02/23) <i>Status: In progress</i>	Sponsored by DST
12. NIH/GWH/ NMCG/19-20	Environmental Flow Assessment for Yamuna River from Hathnikund Barrage to Okhla Barrage	Anupma Sharma (PI), Sharad K. Jain, Manohar Arora, Pradeep Kumar, Rajesh Singh, Vishal Singh	1 year (04/19 - 03/20) <i>Status: In progress</i>	Sponsored by NMCG
13. NIH/GWH/ MoES/19-19	Improving our Understanding of the Aquifer Systems in Sunderbans	Gopal Krishan (PI), C. P. Kumar (Co-PI)	5 months (05/19 - 09/19) <i>Status: In progress</i>	Sponsored by India-UK Water Centre (MoES & NERC)
<b>Other R &amp; D Projects</b>				
15.	Development of Groundwater Model for Integrated Hydrologic Model	Anupma Sharma, B Chakravorti, Surjeet Singh, Suman Gurjar, Sumant Kumar, Nitesh Patidar	3 years (08/18 -07/21) <i>Status: In progress</i>	CEHM, NHP
16.	DSS Planning & Management in Selected States	Anupma Sharma, D S Rathore and Team	6.5 years (06/19 -11/25) <i>Status: to start</i>	NHP

## HYDROLOGICAL INVESTIGATIONS DIVISION

### Work Programme for 2019-20

SN.	Project Title	Study Team	Duration	Remarks
<b>INTERNAL STUDIES:</b>				
1	Integrated hydrological investigations of natural water springs in lesser Himalaya, Uttarakhand	S M Pingale (PI), Sudhir Kumar, S. D. Khobragade, Soban Singh Rawat, Rajeev Gupta	3 years (04/19-03/22)	New Study
2	Isotope fingerprinting of precipitation over Indian Region	Nidhi Kalyani (PI) Sudhir Kumar, MS Rao; Scientists from RC's	3 years (04/19-03/22)	New Study
<b>SPONSORED PROJECTS:</b>				
1.	Understanding of hydrological processes in Upper Ganga basin by using isotopic techniques	Suhas Khobragade (PI), Sudhir Kumar, Rajesh Singh, M. Arora, R. J. Thayyen, S.K. Verma	5 Years (04/16-03/21)	Continuing Study under NMSHE Project
2.	Rejuvenation of Springs and Spring-fed Streams in Mid-Himalayan Basin using Spring Sanctuary concept	Sudhir Kumar (PI) S.K. Verma	3 Years (06/16 -05/19)	Continuing Study Project with GBPIHE



3.	Dating very old ground waters of deeper aquifers in Ganga Plains, India	MSRao (PI) Sudhir Kumar, S.K. Verma	3 Years (06/16 -05/19) Extended till Dec. 2021	Continuing Study IAEA under CRP
4.	Chemical & Isotopic Characterization of Deep Aquifer Groundwater of Middle Ganga Basin	Sudhir Kumar (PI) M.K. Sharma, M. Someshwar Rao, S.K. Verma	3 ½ year (1/18 – 6/21)	Continuing Study PDS under NHP
5.	Integrated Study on groundwater dynamics in the coastal aquifers of West Bengal for sustainable groundwater management	M. Someshwar (PI), Sudhir Kumar, S.K. Verma, Nidhi Kalyani, V. S. Jeyakanthan	3 ½ year (1/18 – 6/21)	Continuing Study PDS under NHP
6.	Development of a comprehensive plan for conservation and sustainable management of Bhimtal and Naukuchiatal lakes, Uttarakhand	Suhas Khobragade, Sudhir Kumar	3 Years (1/18 – 12/20)	Continuing Study PDS under NHP
7.	Unravelling Submarine Discharge (SGD) zones along the Indian subcontinent and its islands (Mission SGD) – Pilot Study	Sudhir Kumar, MS Rao, Nidhi Kalyani BK Purandra YRS Rao	1 year (04/19 – 03/20)	MoES through NCESS

### SURFACE WATER HYDROLOGY DIVISION

#### Work Programme for the Year 2019-20

ONGOING STUDIES (SPONSORED)			
S. No. & Ref. Code	Title	Study Team	Duration
1.NIH/SWHD/17-20	Water efficient Irrigation by using SCADA system for medium irrigation Project (MIP) Shahnehar (PDS-NHP).	R.P. Pandey J.P. Patra Rajesh Singh N.K. Bhatnagar	3 years (Dec 2017 to Dec 2020)
2.NIH/SWHD/16-21	Hydrological modeling 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 March 2021)

ONGOING STUDIES (INTERNAL)			
S. No. & Ref. Code	Title	Study Team	Duration
3.NIH/SWHD/17-21	Development of regional relationships for water availability analysis and flood estimation for lower Godavari basin (3f)	Sanjay Kumar Rakesh Kumar J.P. Patra Pankaj Mani	4 years (April 2017 to March 2021)

4.NIH/SWHD/15-19	Study of hydrological changes in selected watersheds in view of climate change in India	L.N. Thakural D.S. Rathore Surjeet Singh Sanjay K. Jain Sharad K. Jain	4 years (April 2015 to March 2019) extended up to March 2020
5.NIH/SWHD/17-20	Development of regional methods for design flood estimation in Uttarakhand	J.P. Patra Rakesh Kumar Pankaj Mani Sanjay Kumar	3 years (April 2017 to March 2020)
6.NIH/SWHD/18-21	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 March 2021)
7.NIH/SWHD/18-20	Assessment of climate change impact on water availability and agriculture in part of Banas basin.	Archana Sarkar Surjeet Singh Suman Gurjar Sunil Gurrapu	2 years (Nov 2018 to October 2020)
8.NIH/SWHD/18-21	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 March 2021)
9.NIH/SWHD/18-20	Evaluation of water quality of Government schools in Roorkee block, District Haridwar	N.K. Bhatnagar M.K. Sharma L.N. Thakural	2 years (Oct 2018 to Sept. 2020)

<b>NEW STUDIES (INTERNAL)</b>			
<b>S. No. &amp; Ref. Code</b>	<b>Title</b>	<b>Study Team</b>	<b>Duration</b>
10.NIH/SWHD/19-22	Development of drought monitoring system for early warning and preparedness for a selected region in India	R.P. Pandey, D.S.Rathore, Ravi Galkate, Sunil Gurrapu	Proposal to be revised based on comments in the 48 <sup>th</sup> Working Group meeting

### **WATER RESOURCES SYSTEMS DIVISION**

#### **Work Programme for the Year 2019-2020**

<b>SN</b>	<b>Title</b>	<b>Study Team</b>	<b>Duration</b>	<b>Funding (Rs. in Lakhs)</b>
<b>Ongoing Internal Studies</b>				
1.	Hydrological process and characterization of Lesser Himalayan Catchments	M. K. Nema Sharad K. Jain, Sanjay K. Jain, Renoj J.Thayyen, P. K. Mishra	5 years (12/14-12/19)	
2.	Developments of Water Accounts for Subarnarekha Basin Using Water Accounting Plus (WA+) Framework	P. K. Singh P. K. Mishra, M. K. Goel, Suman Gurjar	2 years 2018-2020	
3.	Real time flood modelling using HEC-RTS framework	Vishal Kumar A. K. Lohani, Sanjay K. Jain	2 years 2018-2020	

4.	Seasonal Characterization of Gangotri Glacier melt runoff and simulation of streamflow variation under different climate scenarios	M. Arora Deepak Singh Bisht, Sanjay K. Jain	3 years 2018-2021	NIH
<b>New Internal Studies</b>				
5.	Development of windows based software for Flood Estimation	D. Chalisgaonkar A. K. Lohani, M. K. Goel	1 year (04/19-03/20)	
<b>Ongoing Sponsored Studies</b>				
1.	Development of a project website and hydrological database in Upper Ganga Basin <b>(Sub-project – 1)</b>	M. K. Goel M. Arora, A. K. Lohani, D. S. Rathore, D. Chalisgaonkar, P. Mani, P. K. Mishra	5 years (01/16-12/20)	DST (52.15)
2.	Real-time snow cover information system for Upper Ganga basin <b>(Sub-project – 2)</b>	D. S. Rathore D. Chalisgaonkar, V. S. Jeyakanthan, L. N. Thakural	5 years (01/16-12/20)	DST (48.83)
3.	Glacial Lakes & Glacial Lake Outburst Flood (GLOF) in Western Himalayan Region <b>(Sub-project – 3)</b>	Sanjay K. Jain A. K. Lohani, Sudhir Kumar, P. Thakur (IIRS)	5 years (01/16-12/20)	DST (36.79)
4.	Assessment of downstream impact of Gangotri glacier system at Dabrani and future runoff variations under climate change scenarios <b>(Sub-project – 4)</b>	Renoj J.Thayyen Sanjay K. Jain, Sharad K. Jain, P. K. Mishra, M. Arora, AP Dimri (JNU)	5 years (01/16-12/20)	DST 51.43 (NIH) + 28.29 (JNU)
5.	Observation and modelling of various hydrological processes in a small watershed in Upper Ganga basin <b>(Sub-project – 5)</b>	Sharad K. Jain Renoj J.Thayyen, Sanjay K. Jain, Surjeet Singh, M. K. Nema , P. K. Mishra, P. K. Agarwal, AP Dimri (JNU)	5 years (01/16-12/20)	DST (54.07)
6.	Water Census and Hotspot analysis in selected villages in Upper Ganga basin <b>(Sub-project – 11)</b>	P. K. Mishra M. K. Nema, Renoj J. Thayyen, P. K. Sachan	5 years (01/16-12/20)	DST (90.99)
7.	Dynamics of Himalayan Ecosystem and its impact under changing climate scenario-Western Himalaya	Renoj J.Thayyen P. K. Mishra	3 years (03/17-03/19)	NMHS-MoEF (58.76)
8.	Measurements and Modeling of Evapotranspiration and other Hydrological Processes in Lesser Himalayas	M K Nema Renoj J. Thayyen, Sharad K. Jain, Sanjay K. Jain, P. K. Mishra, AP Dimri (JNU)	3 years (2016-19)	MOES (98)
9.	Sustaining Himalayan Water Resources in a Changing Climate (SusHi-Wat)	Sanjay K. Jain (PI) Sharad K. Jain CSP Ojha (PI, IITR)	3 years (2016-2019)	MOES-NERC, Newton- Bhabha project (11.59)
10.	Investigating Water Stress using Hydro-meteorological and Remote Sensing data	D. S. Rathore L. N. Thakural, Sanjay Kumar, B. Venkatesh, M. K. Jose, T. Chandramohan	3 years 2017-2020	PDS under NHP

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

**Work Programme for the Year 2019-20**

<b>SN</b>	<b>Title of Project/Study</b>	<b>Funding</b>	<b>Study Team</b>	<b>Duration</b>	<b>Status</b>
<b>Internal Study</b>					
1	Study on effect of climate change on sediment yield to Pong reservoir	NIH	A R Senthil kumar (PI) J V Tyagi, S D Khobragade , Manohar Arora	Apr 2015-Mar 2018 (extended upto June 2019)	On-going
2	Bathymetric survey of identified ponds in the districts of Muzaffarnagar, Meerut, Ghaziabad and Baghpat (UP) for development of water management plan	NIH	Digambar Singh (PI) Omkar Singh Rajesh K.Nema Hukam Singh N R Allaka	Apr 2018-Mar 2020	On-going
3	Conservation of ponds in Ibrahimpur- Masahi Village and performance evaluation of natural treatment system	NIH,CEH (UK)	<b>NIH:</b> Omkar Singh (PI) V C Goyal, Rajesh Singh, Digambar Singh, Subhash Kichlu, Rajesh Agrawal, Rakesh Goel, NR Allaka <b>CEH-UK:</b> Prof. Laurence Carvalho	Apr 2018-Mar 2020	On-going
4	Development of DSS for Watershed Hydrology	NIH	V C Goyal (PI) Jyoti Patil, Rohit Sambare	May 2019-Aug 2019	New
<b>Sponsored Projects</b>					
1	Vulnerability assessment of identified watersheds in Chhatisgarh	NNWP (under NIH scheme)	Jyoti P Patil (PI)	Jul 2017- Jun 2019	On-going
2	Hydrological modelling in Bhagirathi basin up to Tehri dam and assessment of climate change impact	DST (under NMSHE)	A R Senthil kumar (PI) J. V. Tyagi, M. K. Goel, S. D. Khobragade, P. C. Nayak, Manohar Arora	Mar 2016-Mar 2021	On-going
3	Rejuvenation of village ponds for identified villages in Muzaffarnagar and Meerut districts of UP	MoWR-funded project-Through INCSW	V C Goyal (PI) Omkar Singh, Digambar Singh, Rajesh Singh, Subhash Kichlu, Rajesh Agrawal, Rakesh Goel, NR Allaka & Project staff	Apr 2017-Mar 2020	On-going
4	Rejuvenation of village ponds in identified villages of Baghpat, Ghaziabad and Meerut districts of Uttar Pradesh	MoWR-funded project (through Scheme funds)	Omkar Singh (PI), Rajesh Singh, V C Goyal, Digambar Singh, Subhash Kichlu, Rajesh Agrawal, Rakesh Goel, NR Allaka & Project Staff	Apr 2017-Mar 2020	On-going

5	Development of water allocation plan for identified watersheds in Kanker district (Chhattisgarh)	NNWP (under Scheme funds)	A R Senthil kumar (PI) T R Nayak, Jyoti P Patil, Rajesh Agarwal	Apr 2018- Mar 2020	On-going
<b>New Sponsored Project</b>					
6	Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)- establishment and operation of 'Live Laboratory' in a rural setting near Roorkee	DST (Gol), Cost: Rs. 5.1 Crore	Partners: NIH, MNIT-Jaipur, IIT-Bombay, IRMA-Ahmedabad V.C. Goyal (PI), Omkar Singh, Rajesh Singh, Jyoti Patil, Rohit Sambare	Jun 2019-Mar 2024	New Project

**Proposed Trainings/Workshop/Activities:**

S.No.	Name of activity	Funding	Team/Div.	Period	Venue
1	Inception cum-Need Assessment of IC-EcoWS Project	DST (Gol)	V.C. Goyal (PI), Omkar Singh, Jyoti Patil, Rajesh Singh, Rohit Sambare	24-25 Jun, 2019	NIH Roorkee/MNIT Jaipur
2	Networking Project on Rejuvenation of Ponds-Review Meeting	DST (Gol)	T. Thomas (PI), Jyoti Patil	14-15 Jun, 2019	NIH Roorkee
3	National Workshop on Scientometrics	NIH	V C Goyal (PI), Archana Sarkar, Rohit Sambare, Furqan Ullah, Charu Mishra	Feb 2020	NIH Roorkee

**Expected Outreach Activities:**

S.No.	Name of activity	Funding	Team/Div.	Period	Venue
1	India Water Week	NIH	RMOD	24-28 Sep 2019	Vigyan Bhawan, New Delhi
2	India International Trade Fair	NIH	RMOD	14-27 Nov 2019	New Delhi
3	Indian Science Congress	NIH	RMOD	3-7 Jan 2020	UAS, Bangalore
4	Any other Outreach activity on demand/assigned	NIH	RMOD		

**List of proposed activities under INC-IHP during 2019-20**

**Meetings to be organised/ attended**

1. Meeting of INC-IHP, during May/June 2019, after obtaining approval on re-constitution of committee from the Ministry
2. 24<sup>th</sup> session of the InterGovernmental Council (IGC) of the International Hydrological Programme of UNESCO, Paris, France
3. 27<sup>th</sup> meeting of the IHP Regional Steering Committee for Asia and the Pacific, to be held at Myanmar in 2019
4. Participation in Asian GWADI meeting
5. Participation of Indian nominees in various UNESCO meetings

**Thematic Trainings:**

1. Training course on 'Water Security Assessment' during July 2019 (Location: New Delhi/ Roorkee)
2. Training course on 'Water Education- Key for Water Security' during March 2020 (Location: New Delhi/ Roorkee)

#### Brainstorming sessions/ exhibitions during conferences/ summits

S. N.	INC-IHP proposed event	Conference/ Summit	Host Organisation	Location	Date
1.	Exhibition on R&D in Hydrology, Wastewater treatment	3 <sup>rd</sup> World Water Summit 2019	Energy and Environment foundation	New Delhi	21-23 Aug, 2019
2.	Brainstorming session on Theme-V 'Ecohydrology-Engineering Harmony for a Sustainable World'	Water future Conference	IISc, Bengaluru	Bengaluru	24-27 Sep, 2019
3.	Session on 'Enhancing sustainable groundwater resources management'	8 <sup>th</sup> Int. Groundwater Conference on Sustainable Management of Soil-Water Resources	IIT- Roorkee	Roorkee	21-24 Oct, 2019
4.	Theme- Water-related Disasters and Hydrological Changes	Int. Conference on Soil and Water Resources Management for Climate Smart Agriculture, Global Food and Livelihood Security	Soil Conservation Society of India (SCSI), New Delhi	New Delhi	5-9 Nov, 2019
5.	Theme- Game-changing approaches and technologies	Int. Conference on Future Cities	IIT- Roorkee	Roorkee	11-13 Dec, 2019
6.	Theme- Promoting innovative tools for safety of water supplies and controlling pollution	HYDRO-2019 (Hydraulics, Water Resources and Coastal Engineering)	Osmania University, Hyderabad	Hyderabad	18-20 Dec, 2019
7.	Theme- Water Education- Key for Water Security	Roorkee Water Conclave 2020	IIT- Roorkee and NIH	Roorkee	26-28 Feb, 2020
8.	Celebration of World Water Day		NIH, jointly with UNESCO New Delhi	New Delhi	22 Mar 2020

#### REGIONAL CENTRE, BELAGAVI

#### Proposed Work Program for the Year 2019-2020

SI No.	Title of the Study	Study Group	Duration	Funding
1	Impact of Land use/Land cover Changes on Ground water – A Case Study	B K Purendra, B Venkatesh	3 years (April 17-March 20)	INTERNAL / MoES
2	Studies on Occurrence, Distribution and Sustainability of Natural Springs for Rural Water Supply in parts of Western Ghats, India	B K Purandra (PI)	3 years (4/17-3/20)	PDS under NHP
3	Assessment of Water Resources in Ungauged catchments of West Flowing Rivers of Western Ghat Region	Chandramohan T (PI); Officer from	3 years (4/18-3/21)	Internal

		WRDO		
4	Climate Change Impact assessment for Jayakwadi Reservoir	B Venkatesh (PI); officers from WRD, GoMah.)	3 years (04/18-3/21)	Internal
6	Estimation of Submarine Groundwater Discharge in parts of Karnataka	B K Purendra and N Vardarajan	2 year (2019 to 2021)	NCESS (MoES)
7	Groundwater Model Development In Micro Basin Of Hard Rock In Krishna And Godavari River Basins Of Telangana	B Venkatesh, M K Jose and Scientist from HQ	3 years (2019 to 2022)	PDS under NHP

### REGIONAL CENTRE, JAMMU

#### Proposed Work Program for 2019-20

No.	Study	Team	Duration	Status
<b>Internal Studies</b>				
1.	Hydrologic and hydraulic modeling for floodplain inundation mapping under future climate change scenarios: A case study of Tawi River, India	R. V. Kale P. G. Jose S. S. Rawat	03 years (August 2018 to March 2021)	PI on deputation Since Sept. 2018 in Japan; study to be effectively initiated on joining at WHRC
2.	Assessment of Hydrological Characteristics of a Western Himalayan River	D. Khurana P. G. Jose S. S. Rawat R. V. Kale	24 months (August 2018 to May 2020)	Ongoing
<b>Sponsored Studies</b>				
3.	Inventory and Dynamics of Springs for Sustaining Local Water Demand in Ravi catchment, Himachal Pradesh	S S Rawat, P G Jose, Sudhir Kumar, R V Kale	04 years (April 2017 to March 2021)	Ongoing PDS under NHP
4.	Integrated Studies on Himalayan Cryosphere using Space Based Inputs	P. G. Jose R. J. Thayyen	02 years (Sep 2017 to Aug 2019)	Ongoing Study funded by SAC/ISRO
5.	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, Suman Gurjar	03 Years Apr 2019 to March 2022	New Study under NMHS, MOEF&CC
6.	Entropy based discharge monitoring technique application for Himalayan rivers	R. V. Kale P. G. Jose M. K. Goel S. S. Rawat	04 years	New Study under NHP_PDS [revised proposal submitted on 31.3.2019]

**REGIONAL CENTRE, BHOPAL**

**Proposed Work Program for the Year 2019-20**

S.N.	Name of the project	Duration	Study Group	Funding
1.	Evaluation of impacts of Rabi irrigation in Ganga river sub basin of Madhya Pradesh	3 years Oct 2017 to Sep 2020	R.V.Galkate (PI), R. K. Jaiswal, T.R. Nayak, T.Thomas	NHP-PDS
2.	Impacts of Upcoming Irrigation Projects and Climate Change on the Droughts and Desertification Scenario for Chambal Basin in Western Madhya Pradesh.	4 years Dec 2017 to Nov 2021	T. Thomas (PI) P.C. Nayak, Surjeet Singh, B. Venkatesh, R.V. Galkate, R. K. Jaiswal	NHP-PDS
3.	Integrated Assessment of the Impacts of Climate Change and Land use Change on the Hydrology of the Narmada basin through Hydrological Modelling Approaches	5 Years Feb 2018 to Jan 2023	T. Thomas (PI) Surjeet Singh, B. Venkatesh, Manish Nema, Prabhash Mishra, S. P. Indwar, Sharad Jain, J. V. Tyagi, M. K. Goel	Special PDS under NHP
4.	Revival of Village Ponds through Scientific Interventions in Sagar District (Sponsored R&D Project by Department of Science & Technology, Govt. of India)	2 years Jul 2017 to Jun- 2019	T. Thomas (PI) Sandeep Goyal, MPCST, Bhopal, Vivek Bhatt, WALMI, Bhopal, Jyoti Patil, NIH, Delhi	DST
5.	Modelling of Tawa Reservoir Catchment and Development of Tawa Reservoir Operation Policy	3 Years Sep 2017 to Aug 2020	S. P. Indwar (PI) T.Thomas, T.R. Nayak, R. K. Jaiswal	NHP-PDS
6.	Estimation of Revised Capacities in Reservoirs of Chhattisgarh State using Digital Image Processing technique: Part-III (Sikasar, Pipariya, Miniyarim Chhirpani and Khutaghat reservoirs)	1 Year Apr 2019 to Mar 2020	R. K. Jaiswal (PI) T.R. Nayak, R.V. Galkate, S. P. Indwar Sh. Akhilesh Verma WRD Raipur	
7.	Hydrological Modelling for Evaluation of Return Flow and Irrigation Planning for Optimal Utilization of Water Resources in the Command of Sanjay Sagar Project in Madhya Pradesh	4 Years Apr 2019 to Mar 2023	R. K. Jaiswal (PI) R.V. Galkate, T.R. Nayak, T.Thomas, S. P. Indwar, D.S. Rathore, A.K. Lohani, Sudhir Kumar, Surjeet Singh	
8.	Development of Decision Tool for Efficient Utilization of Water Resource in Parwati Canal & Dholpur Piped irrigation Project of Rajasthan.	3 Years Apr 2019 to Mar 2022	R. K. Jaiswal (PI) R.V. Galkate, T.R. Nayak, A.K. Lohani, S. P. Indwar	

**REGIONAL CENTRE, KAKINADA**

**Proposed Work program for 2019-20**

S.N.	Title of the Project	Team	Duration	Funding	Status
1	Groundwater Salinity Source identification in Godavari Delta, A.P	Y R SatyajiRao (PI), J V Tyagi, T Vijay, R VenkataRamana	Dec. 2017- March 2020	NHP-PDS Rs 61.09 lakhs (SP-28/2017- 18/PDS-13)	
2	Sedimentation Study of	V.S.	July 2017-	NHP PDS	



	Hirakud Reservoir, Odisha using Optic and Microwave Remote Sensing Technology	Jeyakanthan(PI) J.V. Tyagi, Y.R. SatyajiRao, S.V. Vijaya Kumar, R. VenkataRamana, P.C. Nayak	March 2020	Rs.51.19lakhs (SP-28/2017-18/PDS-3)	
3	Study of the behaviour of Multi-Aquifer system & Aquifer mapping for an effective Groundwater Management in Gunderu Sub-basin, West Godavari District, A.P.	S V Vijaya Kumar (PI) Anupama Sharma Y R SatyajiRao T Vijay	April 2018- March 2021	NHP PDS (partnership with AP SGW &WA Dept.)	
4	Forecasting of Flash flood and management for east flowing rivers of India's Subzone 4(a).	R VenkataRamana Y R SatyajiRao	Dec 2017- Nov.2020	Internal Study	
5	Dam break studies of Somasila, Kandaluru and Pulichintala dams in Andhra Pradesh State	P C Nayak (PI) Y R S Rao A K Lohani	April 2019 – March 2022	NHP PDS (partnership with WRD, AP)	New Study
6	High Performance Advanced Septic System (HPAS) along the villages and Roadside Restaurants	Y R SatyajiRao T Vijay	April 2018- March 2020	IC-IMPACTS (Indo Canada Project)	
7	Unravelling Submarine Discharge (SGD) Zones along the Indian Subcontinent and its islands (Mission SGD)- Pilot Study	Y R SatyajiRao T Vijay	April 2019 to March 2021	Sponsored by NCESS	New Study

### CFMS-GUWAHATI

#### Proposed Work program for 2019-20

S.N.	Title	Study Group	Duration (Month/Year)	Funding	Remarks
1.	Flood Inundation Mapping of Beki River Basin of Assam	S.K Sharma, Rakesh Kumar, Pankaj Mani, Jagadish Prasad Patra, G. Arun	3 years (4/18 to 3/21)	NIH	On-going
2.	Development of regional methods for design flood estimation in North Brahmaputra subzone 2 (a).	S.K Sharma, Rakesh Kumar, Pankaj Mani, Jagadish Prasad Patra, G. Arun	3 years (4/18 to 3/21)	NIH	On-going
3.	Linear Hydrological routing using Satellite precipitation datasets for flood forecasting in parts of Brahmaputra Basin	GulshanTirkey, S. K. Sharma, G.Arun	3 years (4/18 to 3/21)	NIH	On-going
4.	Groundwater Quality Assessment of Morigaon district of Assam with emphasis on Arsenic &	S.K. Sharma R.Singh G. Tirkey	2 years (4/19 to 3/21)	NIH	New Study

	Fluoride Contamination				
5.	Impact of Climate Change on Runoff and Sediment Yield for Puthimari Tributary of River Brahmaputra	Swapnali Barman (PI), J. V. Tyagi, & R.K. Bhattacharya (IITG)	3 Years (11/18-10/21)	NIH	On-going
6.	River basin planning and reservoir operations in Teesta, Rangit & tributaries	Swapnali Barman (PI), M K Goel, Deepti Rani, G Arun Partner: WRD, Sikkim	3 Years (02/19-01/22)	NHP-PDS	New Study

### CFMS-PATNA

#### Proposed Work program for 2019-20

S N	Title	Study Team	Duration
Internal Studies			
1.	Demonstration scheme on Riverbank Filtration in Gangetic plain of Bihar	B. Chakravorty (PI) N. G. Pandey	On going (02/16-03/19) Proposed for extension of one year
2.	River shifting analysis and flow modelling study of Ganga river from Rishikesh to Anupshahar	Pankaj Mani (PI) Rakesh Kumar, J. P. Patra	On going (04/16-03/19) Proposed for extension of one year
Sponsored Study (PDS/NHP)			
3.	Modelling and management of erosion and sedimentation processes in alluvial river using morphodynamic modeling	Pankaj Mani (PI) Rakesh Kumar, J. P. Patra B. Chakravorty & WRD Bihar	New study proposed under PDS (04/19-03/22)