

**MINUTES OF 69<sup>th</sup> MEETING OF  
TECHNICAL ADVISORY COMMITTEE OF  
NATIONAL INSTITUTE OF HYDROLOGY  
HELD ON JULY 21, 2016 AT NEW DELHI**

The 69<sup>th</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 July 21, 2016. The meeting was chaired by Sh. G.S. Jha, Chairman, CWC. The list of the participants is given in Appendix -I.

The Chairman in his opening remarks welcomed the members and the invitees. He appreciated the works being carried out by NIH, and urged that the Institute should gear up to handle new challenges, such as impact of climate change on water resources. He then requested the Member-Secretary to take up the agenda.

Dr V C Goyal, Member-Secretary, also welcomed the Chairman, members and invitees. He then took up the agenda items.

**ITEM NO. 69.2: Confirmation of the Minutes of 68<sup>th</sup> Meeting of TAC**

The Member-Secretary informed that the minutes of the 68<sup>th</sup> meeting of the TAC, held on July 21, 2015 at New Delhi, was circulated vide letter no. NIH/RCMU/TAC/34/11 dated August 14, 2015. Since no comments were received from the members, the Minutes were confirmed by the TAC.

**ITEM NO. 69.3: Action Taken on the Decisions/Recommendations in the Previous Meeting**

The Member-Secretary informed that the suggestions offered during the previous meeting have been noted for compliance.

**ITEM NO. 69.4: Status of the Work Programme for the Year 2015-2016**

The Member-Secretary briefed about the studies carried out by the Institute during the year 2015-16. He informed that 73 internal studies and 12 sponsored projects were taken up during the year 2015-16. He also informed that 244 research papers have been published by the Institute during June 2015-March 2016 & April-June 2016. He further informed that 32 training courses/workshops/ symposia were organized during this period. 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 2015-2016 were presented during the meeting:

1. Water Quality Modelling using Soft Computing Techniques, By Dr. Rama Mehta
2. Web Enabled – Groundwater Recharge Estimation Model (WE-GREM), By Ms. Suman Gurjar
3. The Structure and Dynamics of Groundwater Systems in Northwestern India under Past, Present and Future Climates, By Dr. S.P. Rai

4. Application of DSS(P) for Integrated Water Resources & Management, By Dr. A K Lohani

During discussion on the presentation of these studies, Dr R D Mehta was advised to circulate the report of her study to the TAC members for their comments. Ms Suman Gurjar was advised to check applicability of the developed software module under different geographical terrains (e.g. hilly, hard-rock, coastal).

**ITEM NO. 69.5: Report the Proceedings of the Working Group Meetings**

The Member-Secretary briefed about the 43<sup>rd</sup> and 44<sup>th</sup> meetings of the Working Group of NIH, which were held at NIH, Roorkee, during December 8-9, 2015 & April 18-19, 2016 respectively. During these meetings, the Working Group members reviewed the progress of studies for the year 2015-2016 and also discussed the proposed work programme for the year 2016-2017.

TAC noted the proceedings of the Working Group meetings.

**ITEM NO. 69.6: Work Programme for the Year 2016-2017**

The Member-Secretary briefed about the proposed work programme of the Institute for the year 2016-2017, which was discussed during the 44<sup>th</sup> Working Group meeting of NIH. Director, NIH, informed that due to some administrative reasons, the RCC meetings for most of the Regional Centres could not take place. However, the proposed work programme of the Regional Centres were placed before the TAC.

The TAC approved the proposed work programme of the Institute for the year 2016-2017. The list of studies approved by the TAC for the year 2016-2017 is given in Appendix-II.

**ITEM NO. 69.7: Reporting Items**

1. Details of the consultancy projects carried out by NIH during the year 2015-2016 were noted by the TAC.

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

\*\*\*\*

**Appendix– I: List of Participants**

**Appendix– II: Approved Work Programme for the Year 2016-2017**

**LIST OF PARTICIPANTS OF THE 69<sup>th</sup> TAC MEETING OF NIH**

1. Sh. G. S. Jha, Chairman, CWC, New Delhi
2. Sh. Vinay Kumar, Chief Engineer (HSO) CWC, New Delhi
3. Sh. R.D. Singh, Director, NIH, Roorkee
4. Sh. K. C. Naik, Member (RGI), CGWB, New Delhi
5. Sh. S.B. Tyagi, Sc.E, IMD, New Delhi
6. Prof. N K Goel, IIT, Roorkee
7. Prof. K V Jayakumar, NIT, Warangal
8. Dr. Ravinder Kaur, Project Director, WTC, ICAR-IARI, New Delhi
9. Dr. N G Srivastava, AGM, PCRI, BHEL, Haridwar
10. Dr. V C Goyal, Sc.G & Member-Secretary, NIH, Roorkee

**INVITEES**

1. Dr. N C Ghosh, Sc.G, NIH, Roorkee
2. Dr. Rakesh Kumar, Sc.G, NIH, Roorkee
3. Dr. Sudhir Kumar, Sc.G, NIH, Roorkee
4. Dr. A.K. Lohani, Sc.G, NIH, Roorkee
5. Er. Omkar Singh, Sc.F, NIH, Roorkee
6. Dr. S.P. Rai, Sc.E, NIH, Roorkee
7. Dr. Rama Mehta, Sc.D, NIH, Roorkee
8. Dr. Suman Gurjar, Sc.C, NIH, Roorkee
9. Sh. Sanjeev Kumar, Asstt. Director, CWC, New Delhi
10. Sh. S.C. Mishra, Asstt. Director, CWC, New Delhi

**APPROVED WORK PROGRAMME FOR THE YEAR 2016-2017**

**ENVIRONMENTAL HYDROLOGY DIVISION  
WORK PROGRAMME FOR THE YEAR 2016-17**

| <b>S.No.</b>                             | <b>Study</b>  | <b>Study Team</b>  | <b>Duration/Status</b>  |
|--|---|--|---|
| <b>Internal Studies (Completed)</b>      |   |  |   |
| 1.                                       | Water Quality Modelling using Soft Computing Techniques   | Rama Mehta (PI)<br>Anju Choudhary  | 2 Years<br>(05/14-08/16)  |
| <b>Internal Studies (New)</b>            |   |  |   |
| 1.                                       | Assessment of suitable habitats for the aquatic species of Western Himalayan Stream                                   | Pradeep Kumar<br>C.K. Jain   | 2 years<br>(04/16-03/18)  |
| <b>Sponsored Projects (Continuing)</b>   |   |  |   |
| 1.                                       | Ionic Enrichment Dynamics of Glacial Sediment and Melt water of Gangotri Glacier                                      | M. K. Sharma (PI)<br>C. K. Jain<br>Renoj Thayyan<br>Manohar Arora<br>Naresh Saini<br>Jatin Malhotra<br>Rakesh Goyal<br>Shyam Lal | 3 Years<br>(04/14-03/17)<br>Sponsored by DST<br>Status: Ongoing<br>Project Cost: 32.8 lacs    |
| 2.                                       | Low Cost Technology for Purification of Arsenic and Microbes Contaminated Water using Nanotechnology                  | Vijaya Aggarwala,<br>IITR (PI)<br>Rama Mehta,<br>NIH (Co-PI)   | 2 Years<br>(04/14-03/16)<br>Sponsored by DST<br>Status: Ongoing<br>Extended for 6 months      |
| <b>Sponsored Projects (New)</b>          |   |  |   |
| 3.                                       | Environmental Assessment of Aquatic Ecosystem of Upper Ganga Basin  | C. K. Jain (PI), NIH<br>Manohar Arora,<br>NIH<br>M. K. Sharma, NIH<br>P. Kumar, NIH<br>R. Singh, NIH<br>D. S. Malik, GKU         | 5 Years<br>(04/16-03/21)<br>Sponsored by DST<br>under NMSHE<br>Project Cost: 2.25 Crore       |
| <b>Consultancy Projects (Continuing)</b> |   |  |   |
| 1.                                       | Petroleum Product Contamination at Akolner Village, District Ahmednagar, Maharashtra and Suggesting Remedial Measures | C. K. Jain (PI)<br>Sudhir Kumar<br>B. Purendra<br>Anupma Sharma<br>M. K. Sharma<br>Rajesh Singh                                  | One Year<br>(10/15 – 09/16)<br>Sponsored by: MPCB<br>Amount Rs. 54.72 Lacs<br>Status: Ongoing |
| <b>Consultancy Projects (New)</b>        |   |  |   |
| 2.                                       | Study on Ash Disposal from Telangana STPP into Mine Void of Medapalli Open Cast Mines                                 | C. K. Jain (PI)  | One Year<br>(04/16 – 03/17)<br>Sponsored by NTPC<br>Amount Rs. 54.96 Lacs                     |

**GROUND WATER HYDROLOGY DIVISION  
WORK PROGRAMME FOR THE YEAR 2016-17**

| S. No.                             | Project  | Project Team   | Duration                     | Status   |
|------------------------------------|--|--|------------------------------|--|
| <b>Ongoing Internal Studies</b>    |  |  |                              |  |
| 1.<br>NIH/GW<br>D/NIH/15<br>-18    | Development of Website and e-Portal on "Mitigation and Remedy of Arsenic Menace in India"  | C.P. Kumar (PI), Anupma Sharma, Suman Gurjar, Sanjay Mittal  | 3 years<br>(04/15 – 3/18)    | Ongoing  |
| 2.<br>NIH/GW<br>D/NIH/14<br>-17    | Management of Water Resources for Quantity and Quality in Yamuna-Hindon Inter-basin  | Anupma Sharma (PI), N.C. Ghosh (Coordinator), Deepak Kashyap, IITR (Technical Consultant)  | 3 years<br>(12/14 – 11/17)   | Ongoing  |
| 3.<br>NIH/GW<br>D/NIH/15<br>-16    | Alternate water supply management strategies in arsenic affected/vulnerable areas: Mapping of Arsenic affected zones/regions in Eastern U.P                          | Sumant Kumar (PI) N.C. Ghosh, Rajesh Singh, R.P. Singh, Suman Gurjar, S.L. Srivastava, Anju Choudhary  | 1 year<br>(04/15 – 3/16)     | Ongoing  |
| 4.<br>NIH/GW<br>D/NIH/15<br>-16    | Web Enabled "Groundwater Recharge Estimation Model (WE-GREM)".   | Suman Gurjar (PI), N.C. Ghosh, Sumant Kumar, Surjeet Singh, Anupma Sharma  | 1 year<br>(08/15 – 3/16)     | Ongoing  |
| <b>Ongoing Sponsored Studies</b>   |  |  |                              |  |
| 5.<br>NIH/GW<br>D/NIH/15<br>-18    | Peya Jal Suraksha - Development of Six Pilot Riverbank Filtration Demonstrating Schemes in Different Hydrogeological Settings for Sustainable Drinking Water Supply. | N.C. Ghosh (Project Coord. & Leader) C.P. Kumar, B. Chakraborty, Y.R.S. Rao, Anupma Sharma, Surjeet Singh, Sumant Kumar, Suman Gurjar, S.P. Indwar, R.P. Singh, Anju Choudhury, Sanjay Mittal, Ram Chandar, Staff SW Lab | 2 1/2 year<br>(11/15 – 4/18) | Ongoing<br><br>Sponsored by MoWR, RD & GR under Plan Fund. |
| 6.<br>NIH/GW<br>D/NIH/16<br>-17    | Groundwater fluctuations and conductivity monitoring in Punjab.  | Gopal Krishan (PI), N.C. Ghosh, Surjeet Singh, Dan Lapworth (PI from UK) Alan MacDonald (Project Coordinator)  | 1 year<br>(01/16 – 12/17)    | Ongoing<br>NIH in association with BGS, UK                 |
| <b>Proposed New Internal Study</b> |  |  |                              |  |
| 7.<br>NIH/GW<br>D/NIH/16<br>-17    | Baseline data collection and analysis of Mewat district, Haryana.  | N.C. Ghosh (Project Coordinator), Gopal Krishan (PI), Surjeet Singh, C.P. Kumar,   | 1 year<br>(03/16 – 03/17)    | New  |

|                                       |   |  |   |   |
|---------------------------------------|---|--|---|---|
|                                       |   | Brijesh Yadav (IITR),<br>Lalit Mohan Sharma<br>(Sehgal Foundation,<br>Gurgaon)                   |   |   |
| 8.<br>NIH/GW<br>D/NIH/16<br>-16       | Web Enabled<br>“Conjunctive Use Model<br>for Management of<br>Surface and Ground<br>Water using concept of<br>MAR and ASR”. | Suman Gurjar (PI),<br>N.C. Ghosh, Sumant<br>Kumar, Surjeet Singh,<br>Anupma Sharma               | 08 Months<br>(04/16 – 11/16)                        | New   |
| <b>Proposed New Sponsored Studies</b> |   |  |   |   |
| 9.<br>NIH/GW<br>D/NMSH<br>E/16-21     | Study of river - aquifer<br>interactions and<br>groundwater potential in<br>the upper Ganga basin<br>up to Dabrani.         | Surjeet Singh (PI), N.C.<br>Ghosh, R. J. Thayyen,<br>S. P. Rai, Manohar<br>Arora, Gopal Krishan, | 1 year<br>(03/16 – 02/21)                           | New<br>Sponsored<br>by DST<br>under<br>NMSHE. |
| 10.<br>NIH/GW<br>D/NIH/16<br>-16      | Evaluation of Saryu<br>Nahar Pariyojna(SNP)<br>National Project in Uttar<br>Pradesh.  | N. C. Ghosh<br>Gopal Krishan<br>R. P. Singh<br>J. K. Mishra                                      | 06 Months<br>(03/16-08/16)                          | New<br>Sponsored<br>by MoWR,<br>RD & GR.      |
| 11.<br>NIH/GW<br>D/16-17              | <i>Country-wide Capacity<br/>Building Program on<br/>“Bank Filtration for<br/>Sustainable Drinking<br/>Water Supply”</i>    | N. C. Ghosh, Lead<br>Other Scientists of the<br>division   | 2 years<br>(02/16 – 12/17)<br>4 training<br>courses | Sponsored<br>by DST                           |

**HYDROLOGICAL INVESTIGATIONS DIVISION  
WORK PROGRAMME FOR THE YEAR 2016-17**

| <b>S. No.</b>               | <b>Study</b>   | <b>Team</b>   | <b>Duration/ Status</b>   |
|-----------------------------|--|---|---|
| <b>INTERNAL STUDIES</b>     |  |   |   |
| 1.                          | Interaction between groundwater and seawater along the northern part of east coast of India  | M. S. Rao (PI),<br>Sudhir Kumar<br>Pankaj Garg  | <b>2 years</b><br>(01/15 - 12/16)<br><b>Continuing Study</b>                                    |
| 2.                          | Status Report on Rewalsar Lake, Himachal Pradesh   | SD Khobragade (PI)<br>Sudhir Kumar,<br>C. K. Jain   | <b>1 year</b><br>(04/15 – 03/16)<br><b>Continuing Study</b><br>(to be extended upto July, 2016) |
| 3.                          | Lake-Groundwater Interaction Studies for Sukhna Lake, Chandigarh   | S.D Khobragade (PI);<br>Sudhir Kumar; S. P. Rai,<br>Senthil Kumar; Pankaj Garg                            | <b>3 years</b><br>(04/15 – 03/18)<br><b>Continuing Study</b>                                    |
| 4.                          | Radiocarbon dating of deeper groundwater of Indo-Gangetic Basin  | Dr. M. S. Rao (PI)<br>Dr. Sudhir Kumar  | <b>3 years</b><br>(04/16 – 03/19)<br><b>New Study</b>   |
| 5.                          | Isotopic Investigations in parts of Upper Yamuna River Basin   | S. K. Verma (PI), Sudhir Kumar, S P Rai, Mohar Singh, Vishal Gupta  | <b>2 years</b><br>(04/16 – 03/18)<br><b>New Study</b>   |
| <b>SPONSORED PROJECTS</b>   |  |   |   |
| 6                           | The Structure and Dynamics of Groundwater Systems in Northwestern India under Past, Present and Future Climates                                    | S. P. Rai (PI); M. S. Rao;<br>Surjeet Singh; S. K. Verma; C. P. Kumar;<br>Sudhir Kumar                    | <b>3 years</b><br>(06/12-03/16)<br><b>Continuing Study</b><br>To be extended upto July, 2016    |
| 7                           | Assessment of Baseflow and its Impact on Water Quality in the Part of Satluj River in India using Environmental Isotopes and Age Dating Techniques | S. P. Rai (PI)<br>R. V. Kale<br>M. S. Rao<br>C. P. Kumar<br>Sudhir Kumar                                  | <b>3 years</b><br>(10/12-04/16)<br><b>Continuing Study</b><br>To be extended upto July, 2016    |
| 8                           | Integration of Isotope Hydrology in Aquifer Mapping Efforts in India: A Pilot Study of Upper Yamuna Plains   | Sudhir Kumar (PI); S. P. Rai; S. D. Khobragade;<br>C. K. Jain; P. K. Garg                                 | <b>2 years</b><br>(05/13-03/16)<br><b>Extended by IAEA till Jun 16</b>                          |
| 9.                          | Understanding of hydrological processes in Upper Ganga basin by using isotopic techniques  | S. P. Rai (PI); Sudhir Kumar; Rajesh Singh; S. D. Khobragade; M. Arora; Dr. R. J. Thayyen; Sh. P. K. Garg | <b>5 Years</b><br>04/16-03/21<br><b>New Study</b>   |
| <b>CONSULTANCY PROJECTS</b> |  |   |   |
| 1.                          | Hydrogeological Study for Dewatering of Jhamarkotra Mines, Distt. Udaipur  | Sudhir Kumar  | 05/13-04/16<br><b>Continuing Study</b>  |

| <b>S. No.</b> | <b>Study</b>  | <b>Team</b>   | <b>Duration/ Status</b>                  |
|---------------|---|---------------|--|
| 2             | Hydro-geological study for Gadarwara super thermal power project, Madhya Pradesh      | SD Khobragade | 07/15-06/16<br><b>Continuing Study</b>   |
| 3             | Hydro-geological study for Katwa super thermal power project, West Bengal             | Sudhir Kumar  | 07/15 – 4/16<br><b>Continuing Study</b>  |
| 4             | Hydro-geological study for Darlipali super thermal power project, Odisha              | Sudhir Kumar  | 9/15 – 8/16<br><b>Continuing Study</b>   |
| 5             | Hydro-geological study for Khargone super thermal power project, Madhya Pradesh       | SD Khobragade | 07/15 – 4/16<br><b>Continuing Study</b>  |
| 6             | Hydro-geological and isotopic study for 1x660 MW Harduaganj thermal power project, UP | Sudhir Kumar  | 11/15 – 10/16<br><b>Continuing Study</b> |
| 7.            | Hydro-geological and isotopic study for 1x660 MW Panki thermal power project, UP      | Sudhir Kumar  | 12/15 – 11/16<br><b>Continuing Study</b> |
| 8.            | Hydro-geological study for Kudgi super thermal power project, Karnataka               | Sudhir Kumar  | 11/15 – 10/16<br><b>Continuing Study</b> |
| 9.            | Hydro-geological study for Jawaharpur thermal power project, Etah, UP                 | SP Rai        | 12/15 – 11/16<br><b>Continuing Study</b> |



**SURFACE WATER HYDROLOGY DIVISION  
WORK PROGRAMME FOR THE YEAR 2016-17**

| <b>S.No. &amp; Ref. Code</b>      | <b>Title</b>  | <b>Study Team</b>   | <b>Duration</b>                            |
|-----------------------------------|---|---|--|
| <b>Internal Studies (Ongoing)</b> |   |   |  |
| 1.<br>NIH/SWHD/<br>NIH/13-15      | Quantitative assessment of uncertainties in river discharge estimation  | Sanjay Kumar<br>Sharad Jain   | 3 Years<br>(April 2013 to Sept. 2016)      |
| 2.<br>NIH/SWHD/<br>NIH/13-16      | Evaluation and modeling of hydrological support system for watersheds of Garhwal, Uttarakhand hills.  | Avinash Agarwal<br>Manohar Arora<br>RK Nema   | 3 Years<br>(November 2013 to October 2016) |
| 3.<br>NIH/SWHD/<br>NIH/13-16      | Estimation of Water Balance for Integrated Water Resources Management in Yerrakalva Pilot Basin, A.P.   | J.V.Tyagi<br>YRS Rao  | 2 years<br>(April 2014 to Sept. 2016)      |
| 4.<br>NIH/SWHD/<br>NIH/14-15      | Hydrological modelling of Brahmani Baitarani river basin using eWater Source platform   | J.P.Patra<br>Rakesh Kumar<br>Pankaj Mani  | 3years<br>(April 2014 to March 2017)       |
| 5.<br>NIH/SWHD/<br>NIH/14-17      | Study of Rainfall Patterns and Comparison of Rainfall Data from different Sources for Uttarakhand State                                       | Archana Sarkar<br>Vaibhav Garg, Sc<br>C, IIRS, Dehradun<br>Rakesh Kumar<br>N.K. Bhatnagar         | 3 years<br>(April 2014 to Sept. 2017)      |
| 6.<br>NIH/SWHD/<br>NIH/14-17      | Effect of climate change on evaporation at point scale  | Digambar Singh<br>A. R. Senthil<br>kumar<br>Manohar Arora   | 3years<br>(June 2014 to March 2017)        |
| 7.<br>NIH/SWHD/<br>NIH/14-17      | Flood and Sediment studies in Himalayan basin using MIKE-11 Model   | A.K. Lohani   | 3 years<br>(April 2015 to March 2018)      |
| 8.<br>NIH/SWHD/<br>NIH/15-16      | Snowmelt Runoff Modelling and Study of the Impact of Climate Change in Sharda River Basin   | Achana Sarkar<br>T. Thomas<br>Vaibhav Garg  | 3 years<br>(April 2015 to March 2018)      |
| 9.<br>NIH/SWHD/<br>NIH/15-16      | Study on effect of climate change on sediment yield to Pong reservoir   | A. R. Senthil<br>Kumar<br>J. V. Tyagi<br>Avinash Agarwal<br>Suhass<br>Khobragade<br>Manohar Arora | 3 years<br>(April 2015 to March 2018)      |
| 10.<br>NIH/SWHD/<br>NIH/15-18     | Study of regional drought characteristics and long term changes in supplemental irrigation water requirement in Seonath Basin in Chhattisgarh | R.P. Pandey<br>Rakesh Kumar   | 2 years<br>(April 2015 to March 2017)      |
| 11.<br>NIH/SWD/<br>NIH/15-18      | Effect of Changing Global Tropospheric Temperature on Asia-Pacific Monsoon Circulation and Rainfall Fields across India                       | Ashwini Ranade  | 3 years<br>(Oct. 2014 to March 2017)       |

| <b>Ongoing Sponsored Study</b> |   |   |  |
|--------------------------------|---|---|--|
| 12.<br>NIH/SWHD/<br>NIH/14-17  | Monitoring and modelling of streamflow for the Gangotri Glacier   | Manohar Arora<br>Rakesh Kumar                 | 3years<br>(May 2014 to March 2017)     |
| <b>New Internal Studies</b>    |   |   |  |
| 13.<br>NIH/SWD/NIH/16-18       | Snow cover variability in the Upper Yamnotri Basin  | Naresh Kumar<br>Manohar Arora<br>Rakesh Kumar | 2 years<br>(April 2016 to June 2018)   |
| 14.<br>NIH/SWHD/<br>NIH/16-17  | Generalization and parameter estimation of GEV distribution for flood analysis: Specific application on Indian data | Sushil K. Singh                               | 1 year<br>( April 2016 to March 2017)  |
| 15.<br>NIH/SWHD/<br>NIH/16-19  | Application and development of analytical models on data collected at NIH under Saph-Pani Project                   | Sushil K. Singh                               | 3 years<br>( April 2016 to March 2019) |

**WATER RESOURCES SYSTEM DIVISION  
WORK PROGRAMME FOR THE YEAR 2016-2017**

| <b>SN</b>                       | <b>Title</b>   | <b>Study Team</b>  | <b>Duration</b>                       | <b>Funding<br/>(Rs. in<br/>Lakhs)</b> |
|---------------------------------|--|--|---------------------------------------|---------------------------------------|
| <b>Ongoing Internal Studies</b> |  |  |                                       |                                       |
| 1.                              | NIH_Basin – A WINDOWS based model for water resources assessment in a river basin                | M. K. Goel<br>Sharad K. Jain<br>Deepa<br>Chalisgaonkar<br>Prabhash K. Mishra                             | 3 Years<br>(04/13-03/16)              | NIH<br>(16)                           |
| 2.                              | Glacier change and glacier runoff variation in the upper Satluj river basin                      | Sanjay K. Jain<br>Sharad K. Jain<br>Renoj J. Thayyen   | 2.5 Years<br>(10/13-03/16)            | NIH<br>(12)                           |
| 3.                              | Catchment scale evaluation of cold-arid cryospheric system Hydrology, Ganglass catchment, Ladakh | Renoj J. Thayyen<br>S. P. Rai<br>Sanjay K Jain<br>Sudhir Kumar   | 3 years<br>(04/14-03/17)              | NIH<br>(48)                           |
| 4.                              | Hydrologic Modelling of a part of Satluj Basin using SWAT Model                                  | P. K. Agarwal<br>Sharad K. Jain<br>Tanveer Ahmad<br>M. K. Goel<br>Sanjay K. Jain<br>M. K. Nema           | 2 -3/4 Years<br>(06/14-03/17)         | NIH<br>(23)                           |
| 5.                              | Decision Support System for Water Resources Planning in Upper Bhima basin, Maharashtra           | D. S. Rathore<br>M. K. Goel,<br>R.P. Pandey<br>Sanjay Kumar<br>Surjeet Singh                             | 2 years<br>(07/14-06/16)              | NIH<br>(34)                           |
| 6.                              | Modeling of Narmada basin by using the GWAVA model   | Sanjay K. Jain<br>Sharad K. Jain<br>T. Thomas (RC-Bhopal)<br>P. K. Mishra<br>P. K. Agarwal<br>M. K. Nema | 2.25 years<br>Dec. 2014 –<br>Mar 2017 | NIH                                   |
| 7.                              | Runoff modeling of Shyok River, Karakorum Range  | Renoj J.Thayyen<br>Sanjay K.Jain   | 3 years<br>Dec-2014 to<br>Nov.2017    | NIH<br>(38)                           |
| 8.                              | Hydrological process and characterization of Lesser Himalayan Catchments                         | M. K. Nema<br>Sharad K. Jain<br>Sanjay K. Jain<br>Renoj J.Thayyen<br>P. K. Mishra<br>P. K. Agarwal       | 5 Years<br>12/14-12/19                | NIH+                                  |
| 9.                              | Development of Ganga Information Portal  | Deepa<br>Chalisgaonkar<br>Sharad K. Jain<br>D. S. Rathore<br>Sanjay K. Jain                              | 3 years<br>(04/15-03/18)              | MoWR<br>(65.55)                       |

|                            |  |  |                          |                 |
|----------------------------|--|--|--------------------------|-----------------|
|                            |  | Sudhir Kumar<br>P. K. Mishra<br>P. K. Agarwal<br>M. K. Nema  |                          |                 |
| 10.                        | Study of hydrological changes in selected watersheds in view of climate change in India.             | L. N. Thakral<br>D. S. Rathore<br>Surjeet Singh<br>Tanveer Ahmad<br>Sanjay K. Jain<br>Sharad K. Jain | 3 years<br>(04/15-03/18) | MoWR<br>(44.30) |
| 11.                        | Studies on Temporal Variation of Sediment Yield in Hilly Watershed of Upper Ganga Basin, Uttarakhand | P.K. Singh<br>Sharad K. Jain<br>Sanjay K. Jain<br>M. K. Nema   | 2 Years<br>01/16-12/17   | NIH<br>(8.20)   |
| <b>New Sponsored Study</b> |  |  |                          |                 |
| 1.                         | Mass and Energy balance of Phuque and Khardung glaciers, Ladakh range                                | R.J. Thayyen<br>Farooq Azam<br>P.G. Jose<br>A.P. Dimri   | 3 Years<br>(03/16-02/19) | SERB<br>(65.14) |
| 2.                         | NMSHE SUB-PROJECTS   | -  | -                        | -               |

**RESEARCH MANAGEMENT & OUTREACH DIVISION  
WORK PROGRAMME FOR YEAR 2016-2017**

| SN                                | Title of Project/Study  | Study Team   | Duration                         | Funding                       |
|-----------------------------------|---|--|----------------------------------|-------------------------------|
| <b>Ongoing Internal Studies</b>   |   |  |                                  |                               |
| 1.                                | <b>Study- 1 (RMOD/2015-16/TS-1)</b><br>Water Conservation and Management in Ibrahimpur Masahi Village of Hardwar District (Uttarakhand)   | Omkar Singh (PI), V C Goyal, Dinesh Kumar  | DOS: Apr 2013<br>DOC: Sept. 2016 | NIH                           |
| 2.                                | <b>Study-2 (RMOD/2015-16/TS-3)</b><br>WEAP Model set up for four sub-basins under Pilot Basin Studies (PBS) Programme, jointly with the RCs/CFMSs                                     | <b>NIH HQs:</b><br>Jyoti Patil (PI), V C Goyal<br><b>NIH RCs/CFMSs:</b><br>Chandramohan T (Belgaum), Y R S Rao (Kakinada), T R Nayak (Bhopal), B Chakravorty (Patna), R V Kale (Jammu) | DOS: Apr 2015<br>DOC: Mar 2017   | NIH                           |
| <b>Ongoing Sponsored Projects</b> |   |  |                                  |                               |
| 3.                                | Integrating hydrology, climate change and IWRM with livelihood issues: Development of methodology and a DSS for water-scarce Bundelkhand region in India- preparation of final report | V C Goyal (PI), T Thomas, Jyoti Patil, Rajesh Agrawal  | DOS: Aug 2013<br>DOC: Jul 2016   | TIFAC (Rs 56.64 lakh)         |
| <b>New Sponsored Projects</b>     |   |  |                                  |                               |
| 4.                                | IWRM Based Development Plan for Water Security in Four Districts of Bundelkhand Region in India   | V C Goyal (PI), Omkar Singh, Jyoti Patil, T R Nayak, Ravi Galkate, T Thomas, R K Jaiswal, Shashi P Indwar, Subhash Kichlu, Rajesh Agrawal, Dinesh Kumar                                | DOS: Apr 2016<br>DOC: Dec 2016   | MoWR, RD & GR (Rs 299.4 lakh) |
| 5.                                | Development of a DSS for Hydrology and Watershed Management in Neeranchal Project   | V C Goyal (PI)   | DOS: On sanction<br>DOC: 5 yrs   | DoLR (Gol)                    |

**REGIONAL CENTRE, BELGAUM**  
**APPROVED WORK PROGRAM FOR THE YEAR 2016-17**

| <b>S. No.</b>               | <b>Title of the Study</b>  | <b>Study Group</b> | <b>Duration</b>             | <b>Funding</b>   |
|-----------------------------|--|--------------------|-----------------------------|------------------|
| <b>Internal Studies</b>     |  |                    |                             |                  |
| 1                           | Integrated Water Resources Management (IWRM) on a Pilot Basin – Zuari River Basin, Goa   | CMT, BKP, VCG      | Apr 2013 – Dec 2016         | Internal         |
| 2                           | Modeling of Sediment Yield From River Basins of Kerala & Goa, Using SWAT Model   | CMT and BV         | Oct2014-Sep 2016            | Internal         |
| <b>Sponsored Studies</b>    |  |                    |                             |                  |
| 3                           | Clean and safe drinking water supply to rural community using river bank filtration techniques in hard rock regions of Krishna basin, Karnataka, India.                      | BKP & SK           | Apr 2016 – Mar 2019         | DST Sponsored    |
| 4                           | Impact of Land use/Land cover Changes on Ground water – A Case Study ( <i>submitted for sponsorship from MoES, and is approve in principal and sanction letter awaited</i> ) | BKP & BV           | 3 years (April 16-March 19) | MoES             |
| <b>Consultancy Projects</b> |  |                    |                             |                  |
| 5                           | Dam Break Analysis of Dams in Sharavathi and Varahi River Valley   | BV & All RC Staff  | 2 years                     | KPCL Consultancy |
| 6                           | Hydro-geological investigation in MRPL campus  | BKP & All RC Staff | 1 year                      | MRPL Consultancy |
| 7                           | Hydro-Geological study for Kudgi Super Thermal Power Project Stage-I (3x800) mw, Bijapur, Karnataka  | SK & RC Staff      | 1 year                      | NTPC Consultancy |

**REGIONAL CENTRE, JAMMU**  
**PROPOSED WORK PROGRAMME FOR THE YEAR 2016-17**

| S.No.                       | Study   | Study Team                               | Duration   | Status    |
|-----------------------------|---|--|--|-----------|
| <b>Internal Studies</b>     |   |  |  |           |
| 1.                          | Impact of land use changes on environmental flows of Tawi river at Jammu  | P Kumar<br>MK Nema<br>SS Rawat           | 03 years<br>(Nov 2011 to Oct 2014) extn. upto Dec 2015 | Completed |
| 2.                          | Climate change effects on hydrology of the Tawi basin in Western Himalaya   | MK Nema<br>P Kumar<br>RJ Thayyen         | 03 years<br>(Nov 2011 to Oct 2014) extn. upto Dec 2015 | Completed |
| 3.                          | PBS: Integrated Water Resources Management (IWRM) Study in Tawi River Basin, JK   | P Kumar<br>SS Rawat                      | 05 years<br>(Apr 2012 to Mar 2017)                     | Ongoing   |
| 4.                          | Estimation of sediment yield and identification of areas vulnerable to soil erosion and deposition in a western Himalayan catchment   | SS Rawat<br>P Kumar                      | 01 year 11 months<br>(May 2015 to Mar 2017)            | Ongoing   |
| 5.                          | Hydrological Investigation of Natural Water Springs of Baan Ganga watershed in Jammu & Kashmir State                                  | SS Rawat<br>P Kumar<br>SP Rai            | 02 years 11 months<br>(May 2015 to Mar 2018)           | Ongoing   |
| 6                           | Water Quality assessment of lakes and other surface water bodies in Jammu Region  | PG Jose<br>SS Rawat<br>RV Kale           | 03 years<br>(Aug 2016 to Jul 2019)                     | Proposed* |
| 7                           | Inventory and geotagging of natural water springs with reference to physico-chemical characteristics, Tawi Catchment, Jammu & Kashmir | SS Rawat<br>PG Jose<br>RV Kale           | 03 years<br>(Aug 2016 to July 2019)                    | Proposed* |
| 8                           | Simulating discharges and forecasting floods using advanced measuring and hydrological modelling techniques for Tawi Basin, India     | RV Kale<br>PG Jose<br>SS Rawat<br>SP Rai | 03 years<br>(Aug 2016 to Jul 2019)                     | Proposed* |
| <b>Consultancy Projects</b> |   |  |  |           |
| 1.                          | Establishment of Silt Observation Post (SOP) in the Baglihar HEP catchment  | P Kumar<br>PG Jose<br>SS Rawat           | 06 months<br>(Mar 2016 to Oct 2016)                    | Ongoing   |

\* To be finalized in the upcoming RCC meeting of WHRC, Jammu.

**REGIONAL CENTRE, BHOPAL**  
**PROPOSED WORK PROGRAMME FOR THE YEAR 2016-17**

| <b>S. No.</b> | <b>Title of the Study</b>   | <b>Study Group</b>   | <b>Duration</b>                    | <b>Funding</b>        |
|---------------|---|--|------------------------------------|-----------------------|
| 1.            | Investigation of the Climate Change Impacts on the Water Resources, Droughts and Desertification in Western Madhya Pradesh              | T. Thomas,<br>P. C. Nayak<br>Surjeet Singh<br>B. Venkatesh<br>R. V. Galkate<br>R. K. Jaiswal | 4 years<br>(2016-17 to<br>2019-20) | NHP (NIH)             |
| 2.            | Dam-Break Analysis & Preparation of Emergency Action Plan for a Reservoir in Madhya Pradesh   | R. K. Jaiswal<br>R. V. Galkate<br>T.R. Nayak<br>A. K. Lohani<br>T. Thomas<br>Shashi Indwar   | 4 years<br>(2016-17 to<br>2019-20) | NHP (NIH)             |
| 3.            | Development of Inflow Forecasting Model using RTDAS   | T.R. Nayak<br>R. K. Jaiswal<br>R. V. Galkate<br>T. Thomas<br>Shashi Indwar                   | 4 years<br>(2016-17 to<br>2019-20) | NHP (NIH)             |
| 4.            | Evaluation of Impacts of Irrigation infrastructure development in Madhya Pradesh  | Ravi Galkate<br>R.K. Jaiswal<br>T.R. Nayak<br>T. Thomas<br>Shashi Indwar                     | 4 years<br>(2016-17 to<br>2019-20) | NHP (NIH)             |
| 5.            | Optimization of Gauge and Discharge Station Network of Chhattisgarh   | Ravi Galkate<br>R.K. Jaiswal<br>T.R. Nayak<br>T. Thomas<br>Shashi Indwar                     | 4 years<br>(2016-17 to<br>2019-20) | NHP<br>(Chhattisgarh) |
| 6             | Integrated Reservoir Operation Studies for Mahanadi Reservoir Complex in Chhattisgarh   | T.R. Nayak<br>R. V. Galkate<br>R. K. Jaiswal<br>T. Thomas<br>Shashi Indwar                   | 4 years<br>(2016-17 to<br>2019-20) | NHP<br>(Chhattisgarh) |
| 7             | Assessment of Crop Water Requirement for Selected Command in Mahanadi basin of Chhattisgarh for Optimal Utilization of Irrigation Water | T. Thomas,<br>P. C. Nayak<br>Surjeet Singh<br>B. Venkatesh<br>R. V. Galkate<br>R. K. Jaiswal | 3 years<br>(2016-17 to<br>2018-19) | NHP<br>(Chhattisgarh) |
| 8             | Hydrological modeling for un-gauged catchments in Mahanadi Basin  | R. K. Jaiswal<br>N.C. Ghosh<br>T.R. Nayak<br>R. V. Galkate<br>T. Thomas<br>Shashi Indwar     | 4 years<br>(2016-17 to<br>2019-20) | NHP<br>(Chhattisgarh) |



**REGIONAL CENTRE, KAKINADA  
WORK PROGRAMME FOR THE YEAR 2016-17**

| S.No                     | Title of the Study  | Study Team  | Duration     | Funding                             |
|--------------------------|---|---|--------------|-------------------------------------|
| <b>Internal Studies</b>  |   |   |              |                                     |
| 1                        | Identification of submarine groundwater discharge and sea water intrusion zones in Godavari Delta using integrated approach | Y.R.Satyaji Rao<br>M.S.Rao<br>R.Venkata Ramana                          | 2014 to 2017 | Internal                            |
| 2                        | Identification of Ground Water Recharge zones in Vaippar Basin, Tamilnadu using Remote Sensing and GIS techniques           | V.S. Jeyakanthan<br>J.V. Tyagi<br>R Venkata Ramana                      | 2015 to 2017 | Internal                            |
| 3                        | IWRM Studies (2013-2017): Development of hydrological management practice plans for IWRM in the Lower Yerrakalva Basin      | S.V.Vijaya Kumar<br>Y.R.Satyaji Rao<br>V.S.Jeyakanthan                  | 2015 to 2017 | Internal                            |
| 4                        | IWRM Studies (2013-2017): Assessment of water availability in the Upper Yerrakalva Basin                                    | Y.R. Satyaji Rao<br>S.V. Vijayakumar<br>J.V. Tyagi<br>R. Venkata Ramana | 2014 to 2017 | Internal                            |
| <b>Sponsored Studies</b> |   |   |              |                                     |
| 5                        | River bank Filtration studies in coastal alluvium of Andhra Pradesh   | Y.R.Satyaji Rao   | 2016 to 2019 | New/Under Peya Jal Suraksha Project |

**CFMS, GUWAHATI  
WORK PROGRAMME FOR THE YEAR 2016-17**

| S.No.                   | Title  | Study Group   | Duration (Month/Year)    | Remarks  |
|-------------------------|--|---|--------------------------|----------|
| <b>Internal Studies</b> |  |   |                          |          |
| 1.                      | Evaluation of Ground Water Quality with more Emphasis on Arsenic Contamination in Nalbari District of Assam                      | C. K. Jain<br>S. K. Sharma<br>Gulshan Tirkey<br>Babita Sharma | 2 year<br>(04/16-03/18)  | Internal |
| 2.                      | Short Term Flood Forecasting Using Bootstrap based Artificial Neural Networks within Kuls River Basin (Assam / Meghalaya)        | S. K. Sharma<br>Gulshan Tirkey<br>C. K. Jain                  | 1 year<br>(04/16-03/17)  | Internal |
| 3.                      | Application of USLE Model for Estimation of Soil Loss in Kuls River Basin using Remote Sensing and Geographic Information System | Gulshan Tirkey<br>Sanjay Sharma<br>C. K. Jain                 | 1 years<br>(04/16-03/17) | Internal |

**CFMS, PATNA**  
**APPROVED WORK PROGRAMME FOR THE YEAR 2016-17**

| S.No.                                | Title of the Study  | Study Team  | Duration                | Funding |
|--------------------------------------|---|---|-------------------------|---------|
| <b>Internal Studies (Continuing)</b> |   |   |                         |         |
| 1.                                   | Pilot Basin Studies (PBS) for Mahi River Basin in Ghaghra-Gandak Composite Basin  | B. Chakravorty, Sc.'G'<br>N. G. Pandey, Sc. 'D'   | 4 year<br>(2013-2017)   | NIH     |
| 2.                                   | Time Series analysis of Monthly Rainfall in Mahi Basin  | N. G. Pandey, Sc. 'D'<br>B. Chakravorty, Sc. 'G'<br>Sanjay Kumar, Sc. 'D',<br>SWHD, NIH Roorkee | 3 year<br>(2014-2017)   | NIH     |
| 3.                                   | Demonstration scheme on Riverbank Filtration in Gangetic plain of Bihar   | B. Chakravorty, Sc.'G'<br>N. G. Pandey, Sc. 'D'   | 2 year<br>(2015-2017)   | NIH     |
| 4.                                   | Spatial and Temporal Distribution of Geochemical Characteristics and Environmental Stable Isotopes in Groundwater of North Bengal using GIS and its Assessment with the help of Water Quality Index (WQI) and Existing Classification Systems | S.R. Kumar, Sc. 'D',<br>M.S. Rao, Sc. 'D', HID<br>NIH, Roorkee and<br>Officials from SWID       | Two year<br>(2015-2017) | NIH     |
| <b>Internal Studies (New)</b>        |   |   |                         |         |
| 5.                                   | Development of Relationships between Reference Evapotranspiration (ET <sub>o</sub> ) of Penman-Monteith and other Climatological methods  | S.R. Kumar, Sc. 'D'<br>and scientists from HQ   | 3 year<br>(2016-2019)   | NIH     |