Shri Gajendra Singh Shekhawat assumed the charge of the Ministry of Jal Shakti, a newly created ministry with the merger of the erstwhile Ministry of Water Resources, RD & GR and Ministry of Drinking Water & Sanitation.
MESSAGE OF THE SECRETARY

Dear colleagues,

The late arrival of the monsoon this year along with lower than average rainfall in many parts of the country and incessant rain in other parts of the country have reminded us again of unpredictability of monsoon system as well as climate change. This has aggravated the problem in some of the water stressed area whereas some of the areas witnessed moderate to severe floods. The situation demands forward-looking planning and efficient management of water resource. Our flood forecasting system also needs to be modernised in qualitative & quantitative, terms using the latest technology available world over.

Water, as a whole, is one of the top priorities of the newly formed Government at centre. With the creation of the Ministry of Jal Shakti combining the previous Department of Water Resources, River Development & Ganga Rejuvenation and the Ministry of Drinking Water & Sanitation, the Government has taken a strategic step to place water at the centre of the development goal.

It is, now, our duty to make our contribution in the process of taking water management in India to the next level. The Vision of National Hydrology Project suitably fits into this and I am hopeful that with adoption of latest technology and various studies proposed under NHP, we will be able to significantly improve our water management as well as water governance.

Upendra Prasad Singh
Secretary
DoWR, RD & GR
MoJS

WATER RESOURCES INFORMATION
are now available on one platform:
www.indiawris.com
MESSAGE OF THE JOINT SECRETARY

Dear colleagues,

Growing demand of water, both domestic as well as irrigation/industrial, have put immense pressure on available water resources, surface & ground water. Managing the water resources to meet these demand in coming years will be the key of Government initiative.

A thrust on water management has been provided by the new government with the formation of new Ministry of Jal Shakti. Now, NHP, with its stated objectives, has to rise to the occasion in fulfilling the government and people's aspiration in this regard. Now, after the election process, there is visible sign of increased procurement activities by various implementing agencies. We need to further accelerate other activities also to achieve the project targets.

The upcoming Mid-Term Review (MTR) by World Bank for NHP will provide an excellent opportunity to review the project plan afresh and make some necessary adjustments wherever required. Our objective in this should be to focus on the project’s main activities and direct our efforts towards its implementation, without losing sight of the project's overall objectives.

I am confident that this reflection process will be useful and will help us to concentrate our efforts on the essential elements of NHP. In this sense, I want to thank you for your dedication and your effort on our common journey towards a better management of our water resources.

Akhil Kumar
Joint Secretary
DoWR, RD & GR
MoJS

RELIABLE INFORMATION IS THE BASIS FOR THE PLANNING AND MANAGEMENT OF WATER RESOURCES.

3450 Surface water stations & 9473 Groundwater stations
with real time data transmission are to be installed under NATIONAL HYDROLOGY PROJECT
The National Level Conference on Flood Early Warning for Disaster Risk Reduction was organized jointly by the National Remote Sensing Centre (NRSC), ISRO and the Central Water Commission, Department of Water Resources, RD & GR held under the aegis of the National Hydrology Project during 30 – 31st May 2019 in Hyderabad.

The objective of the conference was to bring synergies among researchers and modellers on the latest technological advancements in the area of flood early warning and to discuss the methodological aspects, database requirements, scale, etc. for carrying out the activity at National level. Early flood warning is the most cost effective, non-structural measure of disaster risk reduction that can prevent the loss of lives and reduce the economic and material damages. The conference was inaugurated and addressed by the Chief Guest, Lt Gen N C Marwah (Retd), Member, National Disaster Management Authority (NDMA). The conference has created a lot of interest among scientists, researchers, engineers, academia, industry, Government Organisations and policy makers working in flood disaster management and associated sectors in the country. It has provided an excellent opportunity for brainstorming on the challenges being faced and the measures to be adopted for flood disaster damage mitigation, creating a platform for decision-makers to deliberate on various technological solutions for preventing or reducing the losses due to disasters.

The sessions covered topics related to flood early warning, spatial flood early warning, trends in hydrological modelling, urban flood modelling, extreme rainfall and flood, and emergency preparedness.

After presentation of conference papers and deliberations, the following recommendations emerged:

- Provide a common platform to all Agencies involved in flood early warning
- Creation of integrated, interoperable and shareable databases
- Capacity development of stakeholders/users
- Understanding and minimising of forecast uncertainties
- Use of emerging technologies both for data collection and analysis by incorporation of state-of-the-art capabilities such as Virtual Reality, UAV, drones and spatial data collection
- Pinpoint the forecast for communities at risk and outreach to communities using a wide dissemination process
- Develop resilience towards flood based damages by reducing uncertainties in predictions
Release of Rainfall Data Validation Manual

During the National Conference on Flood Early Warning for Disaster Risk Reduction in Hyderabad, a Manual on Rainfall Data Validation prepared by Department of Water Resources, RD & GR was released on 30 May 2019.

The manual provides a comprehensive collection of methods for the analysis and validation of rainfall data. For download, please visit the NHP Website: http://nhp.mowr.gov.in/

In eight chapters the Manual describes in details the concepts of primary and secondary data validation, correction, compilation, analysis, and report generation of rainfall data. This manual has been prepared by NPMU in association with the Technical Assistance and Management Consultancy for the Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation under the National Hydrology Project. It presents a compilation of standard methods used for the validation of rainfall data. The manual has been updated and further developed the manuals prepared under the previous HP-I and HP-II projects.

Financial Progress

NHP has shown significant progress in project expenditure during the financial year 2018-19 as compared to previous year 2017-18 (an increase of +123%). During 2019-20, much better performance is expected. The cumulative amount of Annual Work Plan of all agencies for this year works out to be Rs 709.03 crore.

- Since its inception, a total expenditure of Rs.208 Crore has been incurred under the National Hydrology Project till June 2019. During current year, an expenditure of Rs.17 Crore incurred during the 1st quarter ending in June 2019.
- The total Grant/ Fund released to the IAs during the 1st quarter of FY 2019-20 was Rs.56 Crores, whereas the Cumulative release till date is Rs.365 Crore.
- Andhra Pradesh GW, Bihar GW, Telangana GW, Uttarakhand and Survey of India have reported good financial progress during the quarter ending in June 2019.
- During this quarter, grants were released to Survey of India and Uttarakhand.
- An Audit Module is under development under the project MIS. This will help in capturing the status of CAG audits and audited expenditure.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cumulative Funds Released</th>
<th>Cumulative Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-17</td>
<td>52</td>
<td>7</td>
</tr>
<tr>
<td>2017-18</td>
<td>230</td>
<td>64</td>
</tr>
<tr>
<td>2018-19</td>
<td>309</td>
<td>191</td>
</tr>
<tr>
<td>2019-20</td>
<td>365</td>
<td>208</td>
</tr>
</tbody>
</table>
Procurement Status

During the 1st quarter of FY 2019-20, not much procurement activities could be initiated as Model Code of Conduct (MCC) was in vogue due to General Election in the country. However, Implementing Agencies under NHP have used this time strategically to finalise bid documents, sought various clearance regarding floating of bids, evaluation of already submitted bids etc. After lifting of MCC, the procurement activities have started and slowly peaking up.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Procurement Description</th>
<th>Implementing Agency</th>
<th>Estimated Value (In Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Procurement of Real Time Data Acquisition System (RTDAS) for Surface Water</td>
<td>West Bengal SW</td>
<td>1,221.7</td>
</tr>
<tr>
<td>2</td>
<td>Supply, Installation, Testing, Commissioning and Maintenance of Real Time Data Acquisition System (RTDAS) of Assam under National Hydrology Project (NHP)</td>
<td>Assam</td>
<td>1,180.6</td>
</tr>
<tr>
<td>3</td>
<td>RTDAS for Vindhyananchal Region for Surface Water</td>
<td>Uttar Pradesh SW</td>
<td>1,070.0</td>
</tr>
<tr>
<td>4</td>
<td>RTDAS for Madhya Pradesh-Phase 1 (Ganga Basin)</td>
<td>Madhya Pradesh</td>
<td>867.4</td>
</tr>
<tr>
<td>5</td>
<td>RTDAS for Bundelkhand Region for Surface Water</td>
<td>Uttar Pradesh SW</td>
<td>715.0</td>
</tr>
<tr>
<td>6</td>
<td>Construction of piezometers in coastal area</td>
<td>CGWB</td>
<td>661.0</td>
</tr>
<tr>
<td>7</td>
<td>Procurement of DWLR with Telemetry - 526 Nos and Improvement of Existing Piezometer</td>
<td>Gujarat GW</td>
<td>657.4</td>
</tr>
<tr>
<td>8</td>
<td>Groundwater Measurement Equipment DWLR with Telemetry</td>
<td>Madhya Pradesh</td>
<td>615.0</td>
</tr>
<tr>
<td>9</td>
<td>HIS for Gandak Canal System</td>
<td>Uttar Pradesh SW</td>
<td>500.0</td>
</tr>
<tr>
<td>10</td>
<td>DAS for Godavari and Krishna in TS (only Sensors and Telemetry Systems inclusive of respective civil construction) including Data Center requirements</td>
<td>Telangana SW</td>
<td>408.0</td>
</tr>
</tbody>
</table>

MAJOR TENDERS FLOATED

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Procurement Description</th>
<th>Implementing Agency</th>
<th>Estimated Value (In Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5m Digital Elevation Model (DEM) data acquisition and processing</td>
<td>SOI</td>
<td>4,888.0</td>
</tr>
<tr>
<td>2</td>
<td>Creation/ updating of 1:25k geodatabase from satellite imagery and existing database</td>
<td>SOI</td>
<td>3,400.0</td>
</tr>
<tr>
<td>3</td>
<td>DWLR Telemetry</td>
<td>Kerala GW</td>
<td>240.0</td>
</tr>
<tr>
<td>4</td>
<td>Construction of Hydrology Project Convention Centre (HPCC) at Dimapur</td>
<td>Nagaland</td>
<td>227.8</td>
</tr>
<tr>
<td>5</td>
<td>Construction of Data Centre</td>
<td>Meghalaya</td>
<td>215.0</td>
</tr>
<tr>
<td>6</td>
<td>AMC of Existing RTDAS stations in Krishna &amp; Bhima Basin after expiry of ongoing tender</td>
<td>Maharashtra SW</td>
<td>214.8</td>
</tr>
<tr>
<td>7</td>
<td>Procurement of 04 high end workstations for 3-5m DEM processing</td>
<td>SOI</td>
<td>143.3</td>
</tr>
</tbody>
</table>
नदी को बहने दो
शब्द खरों के खोलने दो
उसकी नीरव निस्तब्धता
एक खतरे का संकेत है
इस बात की पुष्टि है
कि नदी हुई समाप्त
शेष रह गई रेत है
बहती नदी
जीवन का यथार्थ है
राष्ट्र का अभिमान है
जीवनता की एक पहचान है
यह उवरस्ता और जीवन
प्रदान करती है
यह जीवनदाइयिनी है
न भयभीत करो
इसे नाले में.. न तब्दील करो
वह कुछ थक-सी गई है
ऐसा लग रहा है कि
वह कुछ सहम-सिमट-सी गई है
नदी को बहने दो
शब्द स्वरों के खोलने दो।
Excerpt from PM’s address in ‘Mann Ki Baat 2.0’ Programme on All India Radio

My dear countrymen, I am happy that the people of our country are thinking about issues, which are posing a challenge not only at the present but also the future. I was reading your comments on NarendraModi App and Mygov and I saw that many people have written a lot about the prevailing water problem. PawanGaurai of Belagavi, Sitanshu Mohan Parida of Bhubaneswar, Yash Sharma, ShahabAltaf and many others have written about the challenges related with water. Water is of great importance in our culture. Rigveda’s ApahSuktam says this about water:

आपो हिष्ठा मयो भुवः, स्था न ऊर्जेद दधातन, महे रणाय चक्षसे, यो वः शिवतमो रसः, तस्य भाजपतेह नः, उष्टीरव मातरः |

Meaning that it is water which is the life force and also, the source of energy. Please bless us like a mother and may your blessings continue on to be showered upon us.

Water scarcity affects many parts of the country every year. You will be surprised that only 8% of the water received from rains in the entire year is harvested in our country. Just and just 8%! Now the time has come to find a solution to this problem. I believe, like the other problems on hand, we can also solve this predicament by the participation of the people, Janbhagidari and their power, Janshakti we are bound to find a solution through the strength, cooperation and resolution of one hundred and thirty crore citizens.

Therefore keeping the importance of water in mind, a new Jalashakti ministry has been created in the country. This will allow faster decision-making on all subjects related to water. A few days ago I tried to do something different. I wrote a letter to the Sarpanchs and Gram Pradhans across the country. That in order to save water, to collect water, to save the very drops of the rainwater, they should convene a meeting of the Gram Sabha and sit and discuss the resolution to this problem with the villagers. I am happy that they have shown exemplary enthusiasm on this front and on 22nd of this month crores of people contributed free labour, Shramdaan across thousands of panchayats. People in village after village resolved to accumulate every single drop of rainwater.
Know Your New India-WRIS and WIMS

Under NHP the existing eSWIS and India WRIS suites are undergoing a fundamental revamping process. The technologies of the previous systems are being up-graded, existing modules are being improved and new functionalities are being added. A generic framework for a State WRIS is under development to manage water resources information at the State level on the India WRIS portal and allow individual States to augment the system with State data in order to enable policy makers, engineers, scientists and other users across the country to get insights into water resources information. Historical and real-time data from CWC, CGWB and State agencies will be fetched from eSWIS. For enhanced visualization, INDIA-WRIS maps 30 layers related to water resources projects like dams, barrages, weirs, anicuts, power houses, canals, command areas, lifts, etc. Also water audit dashboards for various water resources parameters like rainfall, reservoir storage, river points, groundwater level, etc. have been developed. The system is equipped with powerful visualisation tools like heat-maps, tables and charts to view and analyse the data at different hierarchical administrative and hydrological unit levels. A tool for the creation of versions of WRP themes in a spatial database with an online web editor has also been completed for Maharashtra, Gujarat, Uttar Pradesh, Telangana, Rajasthan, Himachal Pradesh and Uttarakhand. Maharashtra and Gujarat have started providing input through the online web editor. A map has been published on ArcGIS Server for the web based editor, WRP, the water data online application, the data availability tool and WIMS using web map, web feature and versioning services. Now the user can view, select and create a GIS map of his area of interest choosing from a list of layers and legends, using a base map gallery and measurement tools. The newly added ‘Select’ tool will allow users to choose features by clicking on the map or choose ‘State’ or ‘Basin’ to select all features under this tool.

A new data availability dashboard on India-WRIS has been developed to provide an instant overview of water data availability for surface and groundwater stations. Colour-coded station-wise information is made available in a pop-up overlay. For manual stations if data for the last 30 days is available the station will be shown as a blue circle, otherwise it will be red. Similarly for telemetry stations if the data of the previous day are available it will be marked in blue, otherwise in red. All information for a selected Agency can be downloaded in Excel format.

Enhancement of WIMS: The previous e-SWIS application is being upgraded with new technologies within the framework of an integrated eSWIS-WRIS system. As the new application will include data from groundwater agencies as well as surface water agencies, it is now renamed as Water Information Management System (WIMS).
In this quarter, access level security requirements of CGWB users have been created and a hierarchical role-based multi-level access authorization system has been added in WIMS. Changes were also made to accommodate users’ requirements in addition to some bug fixing in the existing station management module. A lot of data cleaning and database management activities have also been undertaken before the data migration from various agencies to WIMS takes place, including data from CGWB’s observation wells. The design of a reservoir module and database level changes for the groundwater module have also started during the period.

The sensor configuration module has been redeveloped to add additional checks and validations. The module has been revamped to contain additional inputs from 600+ telemetry stations from the Jaipur ERS, allowing for additional stations to be created by CWC in WIMS. The mapping work for this purpose is ongoing. With these development WIMS will be able to capture data from approximately 1000 INSAT and 250 GPRS stations. To accommodate these changes the INSAT data acquisition module has been improved and is being tested for real-time data display. A segregation of data-types was done based on INSAT, GPRS or manual data collection and the necessary rectifications have been incorporated. During the last quarter, the conversion of 35 reports to the new technology for the export analysis tool has also started.

DVC to establish Wireless based Pipe Flow Meters and initiate Study for improved Reservoir Operation

Wireless based Pipe Flow Meters - The Damodar Valley Corporation is one of the oldest water management agencies in India and the first to implement and manage a multipurpose scheme. DVC is in charge of managing four large reservoirs with diversified water usages, including municipal and industrial water supply, irrigation and generation of hydropower. Industries, urban users and irrigation farmers draw water from the reservoirs on the Damodar River through various canal systems. Water consumption is being calculated based on intake pumping capacity and scheduled running hours. In some industries, various types of flowmeters (turbine, electromagnetic, clamp-on ultrasonic) have been installed at the intake or at pump outlets among which some are functional and some need re-calibration or replacement. Damodar Valley River Regulation Committee (DVRRC) under chairmanship of Member, River Management, CWC allocates water to various stake holders whereas DVC is responsible for billing and collection of revenue based on the set tariff rate.

SYSTEMS BENEFITS:

- The actual withdrawal of each industry can be assessed.
- The revenue collection will be enhanced.
- The surplus water in the DVC system can be allocated to new industrial/domestic consumer in future.
Under NHP, it is proposed to automate the whole process from flow measurement to billing and revenue collection, in order to correctly assess water consumption for domestic and industrial purposes and get real-time information about flow rates, cumulative flow, and total pump running hours at the DVC’s data centre. Based on the information received, monthly water bills can be generated automatically along with various other facilities for customer and connection management.

Technical Assistance & Management Consultant (TAMC) of NHP initiated this project and visited nearly 36 industries, the major water consuming unit of DVC water allocation, in order to study their intakes, pumping stations, and piping networks. This is an essential step towards preparing the bid document for a wireless pipe flow metering and billing system for DVC.

**Initiate Study for improved Reservoir Operation** - In another initiative to improve the Reservoir Operation, TAMC consultants Dr. Nesa Ilich (River Basin Modeling Expert) and Dr. Ashoke Basistha demonstrated the latest developments and available methodologies in reservoir operation before Executive Director, DVC and other senior officials at DVC office in Maithon in April 2019. This activity is a continuation of a reservoir operation study which has been conducted two years ago by the Danish Hydraulic Institute. The DVC management has decided to develop an alternative study in association with the TAMC, with the aim to examine the proposed technological modification and its potential benefits. The input data has already been made available by DVC for the proposed reservoir operation study, which will be conducted by the TAMC consultants during the second half of 2019. Since DVC had many years of historical hydrological data that are readily available, the team is confident that the results of this study will be beneficial for DVC’s future reservoir operation.

**Audit of Hydromet Sites**

The technical audit of hydro-meteorological sites are meant for controlling the operation of these stations and maintaining an effective & reliable monitoring network. The primary purpose of an audit is to ensure whether the monitoring site is delivering the intended information/objective and whether the stated procedure is being followed to collecting these information and, if not, to identify the necessary corrective actions. To improve the functioning of existing hydro-meteorological stations of Central as well as State agencies, it was planned to undertake 100 such audit of surface, groundwater and water quality monitoring sites per year under National Hydrology Project by TAMC experts. An audit template for this purpose has been developed to ensure that all relevant topics are covered. The first batch of audits focuses on groundwater sites. The hydromet audit covers groundwater monitoring stations operated manually and stations equipped with Digital Water Level Recorders (DWLR) and telemetry systems.

The following table shows the details of the implementing agencies selected for the technical audit of GW sites in the first phase:

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>States</th>
<th>Number of Sites Audited</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Punjab</td>
<td>7</td>
<td>May 2019</td>
</tr>
<tr>
<td>2</td>
<td>Uttar Pradesh</td>
<td>7</td>
<td>May 2019</td>
</tr>
<tr>
<td>3</td>
<td>West Bengal</td>
<td>7</td>
<td>To be defined</td>
</tr>
<tr>
<td>4</td>
<td>Tamil Nadu</td>
<td>7</td>
<td>To be defined</td>
</tr>
<tr>
<td>5</td>
<td>Pondicherry</td>
<td>2</td>
<td>To be defined</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Field visits for technical audits of selected groundwater monitoring stations of Punjab and Uttar Pradesh have already been completed.
Important Meetings

**NPMU**

- **Hydrological Informational System Management Group meeting in New Delhi** - 1st meeting of the reconstituted Hydrological Informational System Management Group (HISMG) for monitoring the technical activities of the National Hydrology Project was held on 3rd June, 2019 under the chairmanship of Member (RM), CWC at the CWC headquarters in New Delhi.

- A meeting related to upscaling the flood forecasting activities including inundation forecasts in the Brahmaputra basin was held on 1st April 2019 at Shram Shakti Bhawan, New Delhi under the chairmanship of Joint Secretary (IC&GW) Akhil Kumar to sort out the issues between CWC, NESAC & Ministry. The meeting was attended by officials of NESAC, the Central Water Commission and the NPMU, DoWR, RD & GR.

- To review the PIP of Odisha SW & GW, a meeting was held on 12th April, 2019 at New Delhi. Principal Secretary, WRD, Odisha; Project Director and other senior officials from the SPMU of Odisha discussed the issues in detail with Joint Secretary (IC&GW), SJC-I, SJC-III and other officials from the NPMU.

- On 1st April 2019, meeting with officials of NPMU and Punjab Water Resources Department was held on the issue of the proposed studies to be undertaken in association with the Punjab Agriculture University. The proposal of drilling deep piezometers and the supply and installation of DWLR was also discussed.

- A meeting of the **Tender Evaluation Committee (TEC) for Studies of Narmada Basin** under the National Hydrology Project (NHP) was held on 14th May 2019 at the NPMU office.

- The first meeting of the Coordination Committee on Water Accounting+ and related issues was held on 16th May at CWC under the chairmanship of member, WP & P, CWC.

- A meeting between officers of the NPMU-NHP, DoWR, RD & GR and Irrigation Department of Punjab & Department of Soil and Water Engineering, PAU, Ludhiana was held on 18th April 2019. During the meeting, the technical proposal for the development of Decision Support System for groundwater recharge in the over-exploited blocks of Punjab and the inventory of pesticide residues and heavy metals in surface and groundwater bodies of Southwestern and central districts of Punjab were discussed.

- On 22nd April, 2019 a meeting was held with the project authorities of Ranjit Sagar dam, Punjab to delineate the details of the proposed Decision Support System.

- A team from Chhattisgarh Groundwater Department and NPMU met to discuss piezometer bid details and technicalities of piezometer constructions at NPMU office in New Delhi on 13th June 2019.

**RAJASTHAN**

- Senior Joint Commissioner Shri Neeraj Kumar Manglik reviewed the progress of the Rajasthan Implementing Agency during 2nd and 3rd May in Jaipur. The status of procurement of various items as per the AWP 2019-20 was analysed. The preparation of the ToR for several important studies and the need for capacity building were also discussed in detail. On behalf of the TAMC Mr. Dipesh Desai (Procurement Expert) and Ms. Jaya Sood (Water Resources Management Expert) participated in the meeting.
**CHHATTISGARH**

- A team of the NPMU and TAMC led by Shri Rakesh Kashyap, Senior Joint Commissioner, NPMU-NHP visited Chhattisgarh during the period 1-3 May 2019 to provide implementation support to the Chhattisgarh Surface and Groundwater Implementing Agencies. The focus of the meeting was to solve issues regarding the finalization of RTDAS and construction of piezometer bid documents, as well as to apprise the IA regarding the details of the proposed study for developing rule curves for the reservoirs of the Mahanadi complex.

**WEST BENGAL**

- On 21th May 2019, Mr. Deepak Kumar, Senior Joint Commissioner along with TAMC experts discussed the status of various activities of West Bengal GW. During the visit the team also met the Principal Secretary and appraised him up to do date progress of the project in the State and discussed about ways to further expedite the progress. Some modifications in the PIP was also discussed.

A tripartite meeting was held on 22nd May 2019 at the office of West Bengal SW in Kolkata which included Survey of India, West Bengal SW department and the team from the NPMU comprising Shri Rakesh Kashyap and Shri Deepak Kumar, Senior Joint Commissioners, as well as the TAMC experts stationed at Kolkata. The main objective of this meeting was to determine the way forward to respond to the requirement of West Bengal SW of having a Digital Elevation Model (DEM) with high and medium vertical accuracies. At the meeting, the possibility of getting support from SoI in connecting the RTDAS sites with Sol GTS benchmarks was also explored. In addition the progress of various activities of West Bengal SW was discussed.

**UTTAR PRADESH**

- A team from the NPMU headed by Shri Neeraj Manglik, Senior Joint Commissioner, along with the TAMC experts Shri Desh Raj (Procurement Expert) and Piyush Dubey (Application Programmer) visited Lucknow on 7th and 8th May, 2019 and reviewed the progress of work under NHP. During the visit, the team met Shri Turamalla Venkatesh, Principal Secretary and Project Director to appraise him about the progress of the project in the State.

**Trainings and Workshops**

- **Training Program on ArcGIS and APWRIMS**

  A three day training program under NHP was conducted by the Groundwater and Water Audit Department of Andhra Pradesh in collaboration with ESRI and Vassar Labs. The training was organized in the Farmers Training Center in Vijayawada. About 40 officers of the Groundwater and Water Audit Department of Andhra Pradesh and officers of the Civil Engineering, Hydrology (AP SW) took part in this training. The first two days were dedicated to the basics of ArcGIS, various modules and its applications. Experts from ESRI shared valuable knowledge, followed by hands-on exercises on watershed delineation and zoning of various parameters in ArcGIS. On the third day, the Vassar Labs team explained the various components of the APWRIMS website and the newly introduced Geoportal that includes village-wise groundwater assessment.

- **Induction of NWIC Members and Training on ArcGIS API for JavaScript**

  In the period from 13th to 15th May, NHP organized a three-day training on ESRI products in the NHP-TAMC project office with the participation of NWIC and TAMC IT members. The training aimed at providing the team with an overview of the new technology advancements and allowing the participants to get hands-on experience from of using the ArcGIS API for JavaScript. The training was attended by GIS & remote sensing and software development experts. The training content was based on the systematic flow of information and functionalities from publishing in ArcGIS Desktop to the final development activity. The meeting also included the induction of eight new members of NWIC.
Training Programme on River Discharge Estimation Using Non-Contact Hydrometric Techniques
A five-day exclusive short-term training programme for officials of IAs of NHP on “River Discharge Estimation Using Non-contact Hydrometric Techniques” was organized by the Department of Hydrology of the Indian Institute of Technology in Roorkee from 3rd to 7th June 2019. Twenty five participants from different IAs participated in this program. The objective was to disseminate the knowledge about the new techniques for hydrometric data acquisition and streamflow data analysis, some of which have been developed and demonstrated by the Department of Hydrology of IIT Roorkee and the Research Institute for Hydrogeological Protection (IRPI) of Perugia, Italy.

One week training program on Soil and Water Assessment Tool
A training program on Soil and Water Conservation Tool (SWAT) was organised for the engineers of the Water Resources Department of the Government of Rajasthan from 12th to 16th June 2019. The program emphasised hands-on exercises of participants and the development of SWAT models on personal computers assigned to the participants. Experts from the National Institute of Hydrology in Roorkee also participated in this program delivering expert lectures and providing hands-on training. The program was very successful according to the participants’ feedback. The quiz session at the end of the course indicated that the participants have developed the skills required for SWAT modelling.

Training on Applied Hydrology and Introduction to Hydrologic Modelling by RTI
Under NHP a capacity building program was organized from 25th April to 9th May 2019 at Trivandrum for officials of the Kerala Irrigation Department, the Kerala State Electricity Board and the Centre for Water Resources Development and Management of the Government of Kerala. The program was also marked by the participation of the National Institute of Hydrology in Roorkee, the National Water Academy in Pune and the Orissa Water Resources Department.
38 middle and junior level engineers from these organizations participated in the program. The training module included exposure to the Google Earth engine, an introduction to Python Notebooks, DSS Vue, HEC-HMS, Geo-HMS, Reach & Reservoir Routing. The eminent trainers from RTI International Mr. Jonathan Quebbeman, Ms. Diane Buzzard, Mr. Lalit Mohan and Dr. J. Pandit imparted the training.
The National Remote Sensing Centre (NRSC) has extended its support in the implementation of the National Hydrology Project by providing capacity building training programs on Remote Sensing & GIS technologies and customized applications on water resources. With this objective, the NRSC Water Resources Group has conducted a one-week customised training programme during 24-28 June 2019, in association with the Training and Education Division for Water Resources Engineers of Central and State Government Departments. The course was designed in such a way that it covered the main concepts of Remote Sensing and GIS from the fundamentals to hands-on exercises. The topics covered included an introduction into remote sensing, image enhancement techniques, image interpretation techniques, image processing and classification techniques, introduction into GIS, spatial data analysis techniques, Digital Elevation Model (DEM) applications, open source-GIS and hand-on exercises. In addition, the topics introduction into GPS, RS applications in water resource mapping with hands-on exercise, RS applications in groundwater and introduction to the Bhuvan application were also covered. Dr. P.V.N. Rao, Deputy Director of the Remote Sensing Applications Area of NRSC inaugurated the training programme. He welcomed all participants and gave an overview of the training programme. Dr. V. V. Rao, Group Director (WR) and Project Director (NHP) briefed the participants about the training programme and NHP. A total of 26 officials from water resources departments of both Central and State Governments participated in this course (Assam-2, Chhattisgarh-1, CWC-9, CWPRS-2, Nagaland-2, Rajasthan-2, Tamil Nadu-2, Telanganga-3, and UP-3).
International Distance Learning Course in Hydrology

The National Water Academy in Pune has organized the ongoing programme on Basic Hydrologic Sciences for the Asian Region (2019), in association with the World Meteorological Organization and the COMET Program of the University Corporation for Atmospheric Research’s (UCAR). This seven-weeks online training under the National Hydrology Project has started on 17th June and will be completed on 2nd August 2019. The distance learning course is designed to meet the needs of officials who work with hydrologic data, particularly in the areas of flood forecasting and design flood analysis. The course is intended to provide an understanding of the hydrological cycle, runoff processes, unit hydrographs, flood forecasting and hydrological modelling and will prepare the participants for the further study of hydrological methods and forecasting. The faculty of this course is comprised of the core staff of NWA and experts on the relevant topics from WMO and COMET UCAR. 30 Indian and 26 international participants from other Asian countries are attending this course.

IAs PROGRESS

WEST BENGAL (GROUNDWATER)

West Bengal Groundwater Department has developed an Android based application, namely WB (GW), for the departmental users and the public. It can be downloaded from the Google play store on any android mobile phone. Departmental users can log in and send field or laboratory based hydro-meteorological data to the server and simultaneously view and download data on their mobile phones. Through this application public users can also search as per their interest and view hydro-meteorological data populated in the departmental website.

MAHARASHTRA (SURFACE WATER)

The Water Quality Expert of TAMC visited Maharashtra to assess and discuss the possibility of upgrading the existing water quality laboratories in Nashik, Maharashtra and to finalise the TOR of several proposed Purpose Driven Studies. Dr. S Raghavachari visited three water quality labs and discussed the various issues related to quality control and quality assurance by the laboratories. He also visited the Mula dam in Rahuri, Ahmednagar with respect to PDS on water quality management of Mula dam. The other PDS are dealing with the issue of water pollution in the Panchaganga river basin (Ichalkaranji and Shirol Taluka) and river pollution of the Ujjani project (Khadakwasla to Ujjani project).

KERALA (GROUNDWATER)

The department has successfully developed a design for shallow piezometers. In order to overcome the existing lacunas of reliable groundwater level data, an optimisation of the ground water monitoring network has been undertaken and additional shallow piezometers have been proposed in the PIP. Their procurement has been approved and is included in the annual work plan for the current year. To finalize the design and assess the effectiveness of the shallow piezometers, a pilot well was constructed in the compound of the regional data processing centre at Eranakulam. The drilling and construction of the well was done in the month of June 2019 by utilizing the mini rotary rig of the Groundwater Department. The drilling was done in two phases with a pilot drilling of 6” diameter up to the bed rock followed by the reaming of the hole to 12” diameter. In both phases the drilling was performed with the circulation of bentonite fluid. The 6” diameter well assembly was designed based on the lithologic variations. The annular space between the hole and the casing pipe was filled with sorted gravel and the upper part with carbonaceous non-permeable clay.

Later the constructed well was developed by intermittent pumping until the water was clean. Water level data of the newly constructed shallow piezometer is being monitored twice daily (10.30 AM and 4.30 PM) to get information about the daily fluctuation. Data collected during the short period since the construction is clearly showing the fluctuation of the groundwater level in response to the meteorological conditions. The pilot drilling in order to finalize the design was successful and will be implemented in the State.
TELANGANA
Water Quality Expert Dr. Srikanth Raghavachari visited the water quality laboratories in Hyderabad and Karimnagar. The TMC expert enquired about parameter tested and process of analytical report generation and verified the frequency of data sampling, the reporting and data dissemination methods, the maintenance of lab documents, the historical data and registers, the existing infrastructure, the availability of space and the working conditions of the equipment in the laboratories. The present conditions of the laboratories were found to be satisfactory.

Visit of Team of Scientists from NRSC: The Commissioner CADA (I & CAD) has launched a proposal for developing a Telangana Water Resources Information System (TWIRIS), with the technical support from the National Remote Sensing Centre (NRSC). As part of the water resources information system, the department has shared groundwater data in order to provide groundwater information in the public domain for greater dissemination. In this process technical discussions with the Irrigation and CAD departments, NRSC and CGG officials were held and the data display modules both in terms of tabular and map features were provided. The groundwater information provided in TWIRIS will allow to monitor the status of groundwater scenario at State, district and mandal level on a monthly basis, along with a comparison of rainfall. The department is also planning to create a mobile application for the field team to collect and instantaneously upload field data to TWIRIS.

A team of 13 officials from the Ground Water Surveys and Development Agency (GSDA) of the Government of Maharashtra visited Andhra Pradesh, Ground Water Department for a study tour under the National Hydrology Project during 29th April – 3rd May, 2019. The visit was mainly focussed to gain knowledge from Best practices adopted by AP since 5 years, with the overarching objective to promote the conjunctive use of surface and groundwater in the State. The group got an insight into the following initiatives:

- Establishment of Real-Time Groundwater Monitoring Network System with 1254 Piezometers fitted with Digital Water Level Recorders and Telemetry, collecting and disseminating the groundwater status along with rainfall on a real-time basis
- Geo-tagging of all the 15.03 lakh agriculture bore wells in the State by collecting the spatial information of the bore wells along with certain attributes, using historical data to identify feasible sites for the construction of 1.24 lakh bore wells with solar power under a programme ‘NTR Jalasiri’
- Development of a single stop solution for all water-related data at the “Andhra Pradesh Water Resources Information and Management System” (APWRIMS) with Geoprt
- Development of a web-based Groundwater Resource Estimation software, AP GRACE, and
- Water conservation under the flagship programme “Neeru-Chettu” (Water and Tree) to name a few.

The team also visited a real-time control centre, piezometer sites and a data centre to study the data flow from the piezometers to the central server and the data dissemination system (CM core dashboard, APWRIMS, etc.). They also visited the Polavaram multipurpose irrigation project (national project) and Pavithra Sangamam where the Godavari river joins with the Krishna river under the “Interlinking of Rivers” initiative.

MIZORAM
One of best performing state under NHP and the best among North Eastern State under NHP. Various issues related to Data Centre at Lunglei, ADCP etc at advanced stage.

RAJASTHAN
The RAJASTHAN SPMU organised two trainings on Basic Hydrology from 14 to 18 May 2019 at the MNIT in Jaipur with 25 participants attending each training. In addition, to achieve maximum benefit from NHP, the SPMU has organized zone level one-day workshops in Kota and Hnaimangarh with 50 and 75 participants respectively, sensitising the participants about the National Hydrology Project and how benefits can be achieved in relation to flood preparedness, the use of the eSWIS software for online data entry and other topics.
Rain, nature’s manifest
Recycle from oceans
Cross mountains
Fall on land cost-free.

Daylight, nature’s boon
Solar energy emanate
People boast
Keeping photovoltaic cells.

Tinkering here and there
Little success blown up,
Claiming all is theirs
For human endeavor.

Exploited leaving little
To renew for posterity
Tell a tale on human misery
Threatening our survival.

In euphoria of marching
We forget, what befell later
Ptyriffic victory awaits
Destruction and want.
Erosion and deposition unabated.

Moments restless
Rarely reflect on behind,
Revive on passing
Flowing ahead on reliefs.

Poetry by Dr. K Venugopal
Director, Ambaram-Prakruth (India)

THOUGHTLESS INDULGENCE

UPCOMING EVENTS

NATIONAL TRAINING

- 4 Days training on creation of Digital Elevation Model (DEM)
  NGDC, Survey of India, Dehradun
  19th-22nd Nov, 2019

- Hydrologic Modelling
  National Institute of Hydrology, Roorkee
  18th-29th Nov, 2019

INTERNATIONAL CONFERENCE/TRAINING

- International training in Capacity Development in Groundwater
  ICE WaRM (AWP), Australia
  12th-24th Oct, 2019

- 2nd International Conference On Sustainable Water Management
  Pune, Maharashtra
  6th-8th Nov, 2019

- 8th International Groundwater Conference on Sustainable Management of Soil-Water Resources
  Department of Hydrology, IIT Roorkee, Roorkee, India
  21st-24th Oct, 2019

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Please visit NHPConnect on Twitter, Facebook, Instagram, Youtube & LinkedIn
2ND INTERNATIONAL CONFERENCE 
ON SUSTAINABLE WATER MANAGEMENT

6-8 November 2019, Pune, Maharashtra, India
Hosted by: Water Resources Department, Govt. of Maharashtra
Under the Aegis of National Hydrology Project (NHP), Ministry of Jal Shakti,
Department of Water Resources, RD & GR, Govt. of India

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