



# IISWC News



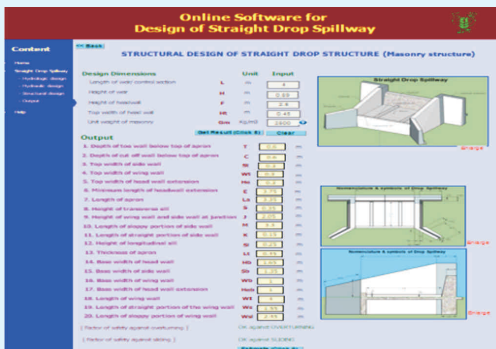
## In this Issue



**Harvesting Spring Water for Doubling Farmers Income**

- IISWC Conferred Swachhta Pakhwada Award
- World Soil Day Celebrated
- Conference on Farmers First for Conserving Soil & Water Resources in Western Region
- Memorandum of Understanding executed with TCS, Mumbai
- World Soil Day

## Next Issue



**Online software for the design of straight drop spillway**

## From The Director's Desk



Water regulation and supply is one of the most important soil ecosystem services in rainfed regions. **Improving infiltration and recharge functions** not only improves soil water storage, base flow, spring flow and ground recharge, but also reduces surface runoff, sealing, crusting, soil degradation, erosion, and floods. It is important to prevent splash erosion, surface crusting and sealing to maintain and improve soil structure and infiltration, and therefore, straw mulching, organic cultivation, *ex-situ* application of organic matter and conservation agriculture are options for cultivated land. Though high density forest has been found associated with high quality water in streams, it is the moderate density forest that has highest ground water recharge. Soil and water conservation measures in watershed mode along with forest management are important to improve water entry into soil. Higher infiltration and base flow under natural mixed vegetation as compared to introduced plantation suggest need of identifying forest type for improved infiltration and recharge. Reduced runoff and erosion, improved infiltration and lean period flow observed in mine-spoiled rehabilitation work carried out by ICAR-IISWC, DehraDun indicates high potential for up-scaling of different soil and water conservation technologies in arable as well as non arable land. Spring health in terms of rate of flow, perennality, lean period flow and quality of water may be used as indicators for water regulation function, including infiltration and recharge in hilly region.

In the context of improving infiltration and recharge, it is important to identify and map infiltration and recharge favorable geological and geo-morphological conditions for defining and mapping **infiltration response units** that includes parameters such as i) Organic matter condition, ii) Surface condition / Land use / Land cover, iii) Surface slope, iv) Soil texture / structure and geology, and v) Soil moisture storage.

The popular 3R technique (Recharge, Retention and Reuse) is universal and core to manage water infiltration in any ecological situation, including mountain eco-systems. The R&D institutions have a plethora of SWC technologies that can be up-scaled for infiltration management in various land use systems with an additional benefit to arrest land degradation. With the overarching issues of water management, these technologies can be further tweaked to make them more amenable to effective resource use, besides providing various ecological services.

The importance of infiltration-recharge study in the context of land degradation and restoration fits well in the emerging conceptual framework of Intergovernmental Science-policy Platform on Biodiversity and Ecosystem Services (IPBES) for converting science into practice. Therefore a prioritized attention for improving infiltration and recharge in rainfed areas, including hilly regions, is required to improve green water component and over all ecosystem services, including prevention of damage due to otherwise unmanaged runoff.

P.K.Mishra

## NEW INITIATIVES

### Externally Funded New Research Projects

- MoU with farmers adopted under Farmers FIRST program for proper use and maintenance of the compost pits constructed under the Project was signed on January 25, 2018.
- MoU was signed between Tata Consultancy Services (TCS) Ltd., Mumbai and ICAR-IISWC, DehraDun on February 26, 2018.
- Replenishment study for extraction of river bed material from the river Ganga in reserve forest of district Haridwar for the year 2017-18.
- Replenishment study for extraction of river bed material from the river Rawasan I & II and Kotawali tributaries of Ganga in reserve forest of district Haridwar for the year 2017-18.
- Assessment of extractable river bed material from river Sharda (Tanakpur) for the year 2017-18.
- Assessment of extractable river bed material from river Gaula for the year 2017-18
- Assessment of extractable river bed material from river Kosi for the year 2017-18
- Assessment of extractable river bed material from river Dabka for the year 2017-18.
- Assessment of river bed material from the river Malan (Kotdwar) for the year 2017-18.
- Study on conservation, remedial and management measures for Nainital Lake, Uttarakhand.
- Advisory services for soil conservation measures while undertaking soil remediation process in mercury contaminated site of HUL, Kodaikanal.

## IMPORTANT EVENTS

### Institute Conferred Swachhta Pakhwada Award

The ICAR-IISWC was awarded the Swachhta Pakhwada Award 2017 (For Institute Category-First Prize) during Director's Conference held at NASC Complex, New Delhi on March 08, 2018. Institute and its eight research centres, spread all over the country has undertaken the mission Swachh Bharat Mission in right perspective and conduct various activities on regular basis to motivate staff members and sensitize the students and villagers in adopted villages. The award conferred is the well deserved recognition of the work being carried out by the Institute.

### World Soil Day Celebrated

World Soil Day was celebrated at IISWC Head Quarters, Dehra Dun and its research centres on December 5, 2017. At ICAR-



IISWC Dehra Dun Sh. Satpal Ji Maharaj, Hon'ble Minister of Tourism, Culture, Irrigation and Minor irrigation, Government of Uttarakhand graced the occasion as Chief Guest. The staff members, students and faculty from Shri Guru Ram Rai University, DehraDun and farmers from four villages adopted by the institute (Hattal, Sainj, Semalta and Naini) actively participated in the proceedings. 'Save Soil Campaign' oath was administered by the chief guest to all the participants. On the occasion two hundred fifty (250) Soil Health Cards were distributed to the farmers. In his address, Sh. Satpal Ji Maharaj appreciated the Institute's efforts in preparing and distributing 'Soil Health Card' and urged the farmers to make proper application of the card. He also spoke about Super Food and Protein Revolution and urged the institute to make efforts in this direction. Sh. Harbans Kapoor, MLA indicated the importance of utilizing improved farm techniques for increasing farmer's income and highlighted the great role which the Institute has to play in achieving it. Dr. S.C. Gairola, DG, ICFRE, spoke about integration of soil & forest and developing strategies to improve forest productivity through soil testing. The participating farmers

expressed their deep gratitude for effort of the Institute in improving the status of farmers in their village and thanked everyone on the occasion. Dr. N.K. Sharma, I/C Director, ICAR-IISWC briefed the gathering about Institutes work and efforts towards soil and water conservation and long relationship of the Institute with the farmers. Dr. D. Mandal, National Fellow and Dr. D.V. Singh, Principal scientist also expressed their views highlighting importance of World Soil Day and Healthy Soil for Healthy Life. A visit to the museum and central laboratory was also arranged for visiting farmers and students.



The ICAR-IISWC, Research Centre, Ballari invited students from three different schools to this particular event. The students were sensitised about importance of soil and its quality for food security underlining the fact that the soil is a precious natural resource and all citizens needs to take responsibility not only to attain higher crop production but also to conserve it for future generations. The centre also conducted an elocution competition on “Soils and Environment” in which around 20 students participated. The students keenly contested and shared their views about natural resources.

ICAR – IISWC, Research Centre, Koraput in collaboration with Department of Agriculture, KVK; Department of Horticulture arranged a awareness programme at the ATMA, State Agricultural Department, Jeypore, to celebrate world soil day. A total of about 100 farmers participated in this event. During the programme, exhibits of different technologies developed by the Centre were displayed. The procedure for collection of soil sample, use of Soil Health Card, for balanced application of fertilizer, importance of organic manure for soil fertility restoration, etc. were discussed in the programme. Sh. Prabhu Jani, President Zilla Parisad, Koraput has graced the occasion as Chief Guest., Dr K. Pradhan, Head

RRTTS, Semiliguda, Smt. Jochnarani Moharana, Sr. Scientist & Head, KVK, Semiliguda, Sh. Umesh Chandra Sahu, Deputy Director Agriculture, Sh. P.K. Sethi, Deputy Director Horticulture, Dr Santun Ku. Takri, Chief District Veterinary Officer, Koraput Dr K. Banarjee of Central University, Koraput, also graced the occasion and expressed their views.

ICAR- IISWC, Research Centre; Udhagamandalam celebrated World Soil Day at Neelampathy village, Coimbatore, Tamil Nadu. Dr. N. K. Prabakaran, Head, Agricultural Research Station, TNAU, Bhavanisagar was the chief guest and inaugurated the programme. In his inaugural address, he stressed the need to manage the soil resources in the context of population growth and food security and highlighted the importance of virtual water requirement and the various other factors for ground water depletion . Dr.O.P.S.Khola, Head of the Centre presided over the function and insisted the farmers to conserve and save our mother earth as soil is one of the important natural resources. As a part of World soil day celebration training on “Water harvesting, sharing and efficient utilization” was also conducted. Pamphlets on soil sampling procedures for testing were distributed to the farmers. Soil and water conservation technologies developed by the centre were also exhibited.

### **Conference on “Food Processing and Kisan SAMPADA Yojna” Organised**

One day conference on “Food Processing and Kisan SAMPADA Yojna” was organised by ICAR-IISWC, DehraDun in collaboration with ASSOCHAM, New Delhi on 13th March, 2018 at DehraDun, Uttarakhand. Hon“ble Governor of Uttarakhand, Dr. Krishna Kant Paul graced the occasion as Chief Guest. He was accompanied by Hon“ble Minister of Agriculture of Uttarakhand Sh. Subodh Uniyal. Dr. P.K. Mishra, Director; ICAR-IISWC; DehraDun and Sh. Chetan Vij, Asstt. Director, ASSOCHAM also graced the occasion. Hon“ble Governor in his inaugural address highlighted the need of processing and value addition of agriculture and allied sectors for ensuring livelihood security of the farmers and stop migration from the hills. He emphasized on the formation of “Agri-business consortium” for bringing all farm to market related information under a single window which could benefit the farmers and entrepreneurs to do the processing activities more smoothly. Sh. Subodh Uniyal, Hon“ble Minister of Agriculture of Uttarakhand, detailed the various Government Schemes benefiting farmers and entrepreneurs for processing and Value addition. Dr. P.K. Mishra in his welcome address explained how inception of food processing starts very early at our home. He stated that



though it was one day program but it is a gateway for awareness for farmers and entrepreneurs who would be benefitted in the long run. Sh. Bhupindar Singh, NABARD, Dr. Bankey Bihari, ICAR-IISWC, Sh. Sailesh Pawar, HARC, Sh. Manoj Gaur, NSIC, Dr. C. S. Pandey, Dolphin Institute of Bio-Medical and Natural Sciences were the keynote speakers who spoke on several aspects of “Food Processing and Value Addition”. At the end the Assistant Director of ASSOCHAM, Sh. Chetan Vij extended a hearty vote of thanks to all the participants of the program. The program was also attended by farmers and students from Dolphin Institute of Biomedical and Natural Sciences, DehraDun.

### Conference on “Farmers First for Conserving Soil & Water Resources in Western Region” Organised

Indian Association of Soil and Water Conservationists, DehraDun in association with ICAR-IISWC, DehraDun and AAU, Anand, Gujarat organised three day Conference on “Farmers First for Conserving Soil & Water Resources in Western Region” during 1-3 February 2018 at Anand Agricultural University. This was the 4th conference in the series after Southern, Northern and North-Eastern region of

the country. Sh. Sanjay Prasad, Additional Chief Secretary, Govt. of Gujarat inaugurated the conference and emphasised on conservation and utilisation of precious soil and water for enhancing productivity and income by reducing cost of production through judicious use of external inputs. Guest of Honour; Dr S.A. Patil, Chairman, Farmers Commission of Karnataka and Former Director of ICAR-IARI shared his rich experience with the farmers and scientists. He inspired the farmer participants by quoting many successful case studies of farmers particularly in the dry region and rain dependent agricultural production area of Karnataka and Maharashtra. Dr N.C. Patel, Vice-Chancellor, AAU, Anand, Gujarat also addressed the participants and requested all the farmers and scientists to share their farming and research experience for the benefits of each other to conserve natural resources to meet food and environmental security. Dr P.K. Mishra, Director, ICAR-IISWC and President of IISWC, DehraDun in his welcome address highlighted the objectives of the conference and emphasised on the importance of conserving natural resources like soil and water in the changed climate scenario to meet the food, nutritional and environmental security. The conference was attended by 350 registered



delegates including 105 invited farmers from the states of Rajasthan, Gujarat, Maharashtra, Goa and UTs of Daman & Diu and Dadra and Nagar Haveli.

Directors, Heads and Scientists of ICAR Institutes and Regional Centers, Academicians from Universities, NGOs etc., from the Western Region also participated. The participating farmers shared their experiences on Land and Water resources conservation though different interventions carried out their own or with the help of KVKs or other research or extension agencies including NGOs. Presentations by Padam Shri Rajendra Singh from Tarun Bharat Sangh, on Community decentralised Land and water management for benefit of Farmers and by Shri Habib Sayyad (co-worker of Shri Popatrao Pawar) on Hiware Bazar – model village development were key attractions in addition to addresses by experts on relevant issues for farmers of this region. The valedictory function was chaired by Dr T. Mohapatra, Secretary (DARE) & DG (ICAR). All the 105 invited farmers were felicitated by dignitaries for their contributions and encouragements. Researchers and students from different Institutions and Universities presented their work and achievements in farmer’s perspective through posters.

#### **Seminar on “Scientific Mining of River Bed Material and Environmental Impact in Hilly and Foot Hill region” Organised**

ICAR-IISWC organised a two day all India seminar in association with IE(I), UKSC and Indian Association of Soil and Water conservationists(IASWC) during 24-25 October, 2017 at IE(I), UKSC Conference Hall, DehraDun. Dr. V.K. Bahuguna, Ex DG, ICFRE graced the occasion as Chief Guest. Swami Chitanand Sarswati from Parmarth Niketn, Rishikesh and Dr. Anil Prakash Joshi, Director HESCO was Guest of Honour. Dr. V.K. Bahuguna in his inaugural address said that unscientific

mining brings lot of sediment, contaminate water and causes huge environmental damage. Swami Chitanand Sarswati emphasised on conservation of rivers and enunciated that rivers are inherited by us from our earlier generations and should be used so as to keep them intact for sustenance of our future generations. He said that if “river dies than India will also die”. Dr. Anil P. Joshi said that currently no data is available for how much material is being extracted from the riverbeds. He expressed the need of setting up independent Mining Corporation on the pattern of the forest corporation to undertake mining works in the state. Dr. P.K. Mishra, Director and co-chairman of the programme appraised the works being undertaken by the ICAR-IISWC and said that Institute is providing regular services to the State government/Forest department for estimating the RBM to be extracted from the rivers. two technical sessions, i) Scientific approach, planning and extraction methods/ techniques for river bed mining chaired by Dr H.C. Shrama, Dean college of Technology, GBPUAT, Pantnagr and ii) RBM policy, rehabilitation strategies and management of mined areas chaired by Dr P.K. Mishra, Director, ICAR-IISWC, DehraDun were conducted.

#### **Visit of Quinquennial Review Team (2012-17)**

The Quinquennial Review Team (QRT) under chairmanship of Dr. Pratap Narain (Ex-Vice-Chancellor, RAU, Bikaner and former Director, CAZRI, Jodhpur).The other members of team being Dr. M.V. Ranghaswami (Dean Agril Engg., Bannari Amman Institute of Technology, Sathyamangalam, TN), Dr. Basudev Behera (Prof & Head, OUAT, Bhubaneshwar, Odisha), Dr. S.P.S. Kushwaha (Retd. Prof & Head, IIRS, Dehradun, UK) and Dr. G. Maruthi Sankar (Retd Pr. Scientist, ICAR-CRIDA, Hyderabad, Telangana) conducted review of research, extension, training and other activities at Institute Headquarters, Dehradun during December 19-20, 2017. The





pective Heads of Divisions ie Hydrology & Engineering (Dr.P.R. Ojasvi), Soil Science & Agronomy (Dr. N.K. Sharma), HRD &SS (Dr. Bankey Bihari) and Plant Science (Dr. Harsh Mehta) made presenten-tation for the period under review. Dr. Pawan Sharma, Head, ICAR-IISWC Research Centre, Chandigarh presented research achievements of the Research Centre. Dr. Charan Singh and Dr. Bankey Bihari presented activities of TSP and TOT projects, respectively. The Quinquennial Review Team also reviewed research, extension, training and other activities at Research Centre Udhagamandalam, Ballary and Koraput to review research and other activities of the Centres. Dr. Harsh Mehta, Head (Plant Science) conducted the proceedings as Member Secretary.

### MoU Executed with TCS, Mumbai

Institute signed Memorandum of Understanding with TATA Consultancy Services (TCS) Limited, Mumbai on 26th February, 2018 in order to provide the ICT Extension services to the farmers of the nine states i.e. Uttarakhand, Chandigarh, Uttar Pradesh, Rajasthan, Madhya Pradesh, Odisha, Karnataka, Gujarat and Tamil Nadu. The memorandum underlines collaboration with regards to ICT based extension activities under the name “IISWC & TCSL Collaboration – PAWS (personalized advisory on water and soil)” which will be based on TCS patented platform mKRISHI®.



### Mera Gaon Mera Gaurav (MGMG)

Wide range of events were organised at Institute Head Quarters as well as at its Research Centers under MGMT. At Koraput a training programme on “Rainwater conservation techniques for enhancing crop productivity” was organised at Jharaput and Rajput villages adopted under MGMT in Semiliguda Block of Koraput District on 23rd and 24th

November, 2017. The Training-cum-demonstration programme was organised to create awareness about soil water conservation and rainwater harvesting and its effective utilization in raising profitable crops in lean season. Techniques of rainwater conservation, nursery raising in vegetable crops and their successful management at different stages were explained through demonstration.



Research centre Kota, conducted six trainings {two-days each} in the MGMT villages viz, Ardana, Narsinghpura, Amlia, and Charadan (Baran District) and Kanhihera, Jhakan, Piplaiya, Manditiya and Delunda of Bundi district. In addition to that advisories and guidance were communicated to farmers through personal contacts/ mobile/sms etc.



Four trainings (two days each) on Recent Development of Organic Farming Techniques/ Rain Water Harvesting Techniques in Degraded Land /Medicinal and aromatic plant production techniques under ravine lands etc were conducted at ICAR-IISWC, Research Centre; Vasad under MGMT programme. Lectures on composting and vermin composting techniques, importance of organic farming, soil sampling techniques and field demonstrations on soil

sampling were conducted. The trainees were explained about the Rain Water Harvesting Techniques and its importance, details of Jalkund construction and other rain water harvesting structures. Lectures were conducted about different cultivation aspects of various medicinal and aromatic plants. Also a visit to ICAR-DMAPR, Boriyavi; Anand was arranged to familiarise the farmers with different medicinal and aromatic plants.

At Research Centre Agra a number of meeting, goshthies & trainings were organised in adopted villages under MGGMG scheme and provided information to the farmers regarding crop management practices based on weather, soil and water to increase the crop productivity; benefits of horticulture crops and trees, animal health (treatments and measures of various diseases of animals, milk quality and productivity), benefits of using improved seeds, balanced fertilizers, integrated pest management and crop diversification, efficient use of water based on the weather; agricultural communication technologies.



At Research Centre Ballari, eleven meetings/ exposure/ awareness programmes were organised in villages adopted under MGGMG programme. Extension material on fruits, vegetables and other crops were distributed. The farmers were sensitized about the importance of soil testing for crop production. Soil health cards were also distributed.

At Institute Head Quarters, Division of SS&A conducted two (one day each) training programme under MGGMG at village Phateu and Ichhla of Kalsi Block, DehraDun (2nd and 6th January 2018). Area specific issues particularly about the effects of rainwater, insect-pest and fertilizers as well the effects of climate change on their crop productivity were discussed in detail. Farmers utilised the opportunity to clear their doubts about better crop using latest seeds, use of

appropriate quantity and time of pesticides/insecticides/ fertilizers, solid waste as well as soil health management.

### Swachh Bharat Abhiyan

At institute Head Quarters Dehra Dun and its eight Research Centres (Agra, Bellary, Chandigarh, Datia, Koraput, Kota, Udhagamandalam and Vasad) wide range of assignments were accomplished under Swachh Bharat Abhiyan. All the staff members took active part in creating awareness and cleaning surrounding localities. A good number of villagers and students were sensitised about cleanliness and health by conducting a variety of awareness programmes.



### National Agricultural Education Day Celebrated

On the occasion of National Agriculture Education day (3rd December, 2017) a number of programmes were organised at Institute Head Quarters DehraDun and its different research centers. At ICAR-IISWC, Dehra Dun main function was organised at Research Farm, Selaqui; On the occasion; students from Uttaranchal University, Shivalik Institute of Professional Studies and Himgiri-Zee University, Selaqui,





DehraDun visited the Soil and Hydraulic Laboratory, Horticultural Nursery, Meteorological Observatory and interacted with Scientist and Technical officers. Also, demonstration on Soil CO<sub>2</sub> flux measurement by using Infrared-Gas analyser was conducted.

ICAR-IISWC, Research Centre; Vasad organised field/farm and laboratory visit for the students and teachers from local schools. On the occasion, apart from creating awareness about agricultural issues, quizzes were also organised.

ICAR-IISWC, Research Centre, Ballari on the occasion, conducted an Essay competition on topic „Importance of Agriculture in Indian Economy“. Students - Scientists“ interaction on agriculture education related issues was also arranged. Students from different schools actively participated in the event.



ICAR-IISWC, RC Koraput marked the day to sensitize the school children regarding the importance of agriculture in general and agricultural education as carrier in particular. Students from five different schools of Koraput district

participated in the celebration. Dr M. Madhu, Head of the centre discussed the avenues available in the agricultural education after schooling and job opportunities. On the occasion an elocution completion for visiting students was also arranged.

### Farmers Day Celebrated

On the occasion of “Farmers Day” on December 23rd 2017, the ICAR-IISWC, Research Centre, Ballari organised a programme at TSP village (Hanumapura) of Molahalamuru Taluk, Chitradurga District, Karnataka. Dr. S.L. Patil Head of the Centre presided over the function and elucidated significance of the programme to the villagers. The farmers were sensitised about soil health, improved crop varieties along with integrated nutrient management for increasing crop productivity as well food quality.. During the programme, 58 Nos. of soil health cards were distributed among farmers and were made to understand the information provided on soil health cards. In addition, the seedlings of Drumstick (Var. PKM-1) that were raised in nursery were distributed to the farmers. Sh. Parameshwarappa of Hanumapura village appreciated the work being carried out by the centre.



### Vigilance Awareness Week

Vigilance Awareness Week was inaugurated on 30/10/2017 at institute Head Quarters DehraDun. Speaking on the occasion Dr. P.K. Mishra, Director of the institute underlined the fact that nobody is corrupt by birth, rather circumstances make the people to work and behave differently in a way that is not desirable or acceptable by the society. He also stressed that everybody should follow their conscience. Dr. Bankey Bihari, Principal Scientist and Vigilance officer, gave a presentation & briefed the gathering about how to go about different measures to fight the problem of corruption and to



ensure an honest, transparent, accountable and peaceful atmosphere for every citizen of the country. At research centre Vasad on October 30, 2017 oath ceremony was arranged for the staff members and a group discussion about the importance of vigilance awareness in our lives was arranged. This was followed by essay competition on October 31, 2017 and a discussion-cum-debate on Corruption Free India on November 02, 2017. A special lecture by Sh Vijay Kumar, AO, ICAR-DMAPR, Boriavi was delivered about ways and means to avoid corruption in ICAR purchase and procurement through GeM, digital publishing etc. The closing ceremony was organized on November 04, 2017.

Vigilance awareness week was observed from 30th October to 4th November, 2017 at Research Centre, Ballari. Dr. S.L. Patil read out the messages of the Vice President of India and the Vigilance commissioner of India and advised all the staff members to take e-pledge by visiting the website ([www.cvc.nic.in](http://www.cvc.nic.in)). All the staff members actively participated in programmes organised on the occasion to create awareness among public. In addition, an essay writing competition was conducted for students (above 12 years) from Kendriya Vidyalaya, Ballari Certificates and prizes were distributed to the participants and winners of essay competition.



At Research Center, Koraput observed the Vigilance Awareness Week was conducted at Research Centre on 30th October, 2017 and all the officers and staff took pledge on "Vigilance Awareness". In *Rosaiput tribal village* of Rajput panchayat "vigilance awareness campaign" was held on 3rd November, 2017. On the occasion an essay competition was organised involving students from threeschools viz. Govt. High School, Simliguda, SC & ST Development Govt. High School, Sunabeda, Sri Jagannath Vidya Pitha, Sunabeda.

#### Four Months Regular Training Conducted

Four Month's Certificate Course on Soil and Water Conservation and Watershed Management (117th Batch) was successfully conducted at IISWC, Dehra Dun (9th October, 2017 to 8th February, 2018). On the occasion of inauguration, Dr. K. Alagusundram, Deputy Director General ICAR, Engineering and NRM graced the occasion as Chief Guest. He shared his experience about resource poor countries like Israel which has made tremendous development in the field of agriculture despite having scarce water and soil resources. India as a country are blessed with these resources and is growing in the field of agriculture, but still better things could be done with our efforts for a sustainable development of the country. He suggested the officer trainees to reach out to the society to spread the knowledge of soil and water conservation and make more people aware about them and learn to value them. Dr. P.K. Mishra, Director, ICAR-IISWC in his address emphasized the importance of conservation of natural resources and how this training program helps to percolate knowledge to different stake holders through the officer trainees to all parts of the country. He highlighted the importance of the training in the context of Doubling Farmers Income, PMKSY schemes and its significance particularly for the rain-fed areas of the country. Dr. Bankey Bihari, Head I/C, HRD & Social Science division briefed about the training program which began in 1956 at ICAR-IISWC and has been continuing since then. The valedictory function was conducted on February 8th, 2018. A total of 25 Officers representing nine states (Punjab-2; Jammu and Kashmir-4; Karnataka-3; Kerala-1; Chattisgarh-6; Madhya Pradesh-3; Uttarakhnad-1; Uttar Pradesh-4; Gujarat-1) participated in the programme of which three women participants were there. Dr. V. P. Chahal, Hon'ble ADG (Extension), ICAR-New Delhi graced the occasion as the Chief Guest and presented the merit certificates to the merit holders for their outstanding performance during the training.

#### Four Months Institutional Training Conducted

ICAR-IISWC, Research Centre, Udhagamandalam organised four months Institutional Training on Soil and Water Conservation for B.Tech Students of College of Agricultural Engineering, Bapatla from 05th June to 05th October 2017. The training schedule covered theoretical as well as practical aspects on soil and water conservation structures, drainage line treatments, water harvesting and recharge structures, hydrology and related subjects. The trainees did surveying



and prepared the detailed Project report for Nunthala watershed. Valedictory function of training was held on 04.10.2017 at IISWC, Regional Centre; Udhagamandalam.

### Winter School on Climate Change Conducted

ICAR-Indian Institute of Soil and Water Conservation, Research Centre, Udhagamandalam organised 21 days Winter School on “Advanced Technologies in Natural Resource Management to Mitigate Climate Change Impacts” from 9th November to 29th November, 2017 sponsored by ICAR, Ministry of Agriculture and Farmers Welfare, Government of India. The Valedictory function of the programme was organized on 29th November. Dr. S.B. Thampi, Deputy Director General, Indian Meteorological Department; Tamil Nadu Region was the chief guest. Dr. S.B. Thampi in his address stressed the need to analyse the causes for climate change and remedies to mitigate the effects. He also told the participants to make use of the knowledge gained here to convert the threats of climate change effects into opportunities. Mr. Amar Kushwaha IAS, Project Director, Special Area Development Programme (SADP) was the guest of honour. Mr. Amar Kushwaha in his address emphasized the use of location specific and viable technologies to address the climate change issues. He also stressed the need create awareness about climate change effects at the grass root level to mitigate and adopt to the climate change as it is not possible to completely stop climate change effects. The twenty one days programme covered wide variety of topics like climate extreme events, food security, climate models etc. About fifty eminent scientists working on climate change from all over India were invited to share their experience and expertise to the participants of the winter school. In all twenty three Scientists & professors from research organisations and universities from different fifteen states of

India participated. Heads; of other government institutions in Ooty including Dr. P. Subramanian, Director, Tribal Research Centre, Dr. Atul Jain, Scientist in charge Cosmic Ray laboratory and Dr. S. Rajan, Officer in charge, Survey of Medicinal Plants and Collection Unit. Ministry of Ayush also participated in the programme.



### International Training Programme under Aegis of India Africa Forum Summit-III Conducted

International Training Program under the Aegis of India Africa Forum Summit-III was organised at ICAR- IISWC, Dehra Dun from 6th to 20th March, 2018. The inaugural function of the “International Training Program on Soil and Water Conservation and Watershed management” was held on 6th March, 2018. The fifteen day program was a part of the 15 short term trainings organised by the Department of Agricultural Research and Education – ICAR under the India Africa Forum Summit-III and sponsored by the Ministry of External Affairs, Govt. of India. Fourteen African delegates from 6 countries viz., Ethiopia, Ghana, Kenya, Malawi, Nigeria and Zambia in Africa are participated in the training program. Dr. V. N. Sharda, Ex-member ASRB and Ex-Director ICAR-IISWC, DehraDun, chaired the inaugural function as the Chief Guest and shared his vast experience on soil and water conservation and watershed management in India and as well as in abroad. He emphasized upon process based methodology and techniques related to natural resource management for implementation in highly erratic scenarios and its monitoring. Dr. P.K. Mishra, Director, ICAR-IISWC, DehraDun greeted the participants and referred to the common interests of both India and African Nations in agriculture and natural resource management. The valedictory function was conducted on 20th March 2018 and certificates were distributed to the participants.



**ICAR-Indian Institute of Soil and Water Conservation Dehradun, India**  
**International Training Programme**  
 Soil-Water Conservation and Watershed Management  
**(India-Africa Fom Summit-III)**  
 6-20 March, 2018



day on Oct. 18, 2017. Shri Bahadur Singh, ex-technical Officer, ICAR-IISWC, Research Centre, Kota was the chief guest. Dr. R.K. Singh, Head of ICAR-IISWC, Research Centre, presided over the function. Retired and serving personals attended the celebration. In this programme 136 numbers of retired and serving personals of the Centre participated. Retired personals shared their experience as well expressed expectations that are to be achieved in future.

**Additional Secretary (DARE) & Secretary (ICAR) visited R.C. Chandigarh**

Shri Chhabilendra Roul, Addl. Secretary DARE & Secretary ICAR, New Delhi, visited Research Centre, Chandigarh on 24th November, 2017. Dr. Pawan Sharma, Head of the centre, briefed him about the most significant achievements of the centre in research, training and consultancy works related to soil and water conservation. She highlighted the ongoing activities of the centre, and its impact on farmers. In an interaction with the scientists and administrative person of the centre, the Secretary expressed his concern about settlement of land transfer cases with HUDA. He



**Training for Administrative Staff**

Five day training programme for administrative (up to AAO Level) staff members from institute Head Quarters and its eight Research Centres was organised during 18-22 December 2018. In all forty one (41) administrative staff (up to AAO Level) members participated. The training programme primarily focussed on sensitization about new rule of procurement/payment etc as notified by Government of India and up gradation of knowledge base with regards to day to day administrative matters.

**Short Course for Skilled Supporting Staff**

At Research Centre Vasad two days short course training programme on "Skilled enhancement on latest official development and soft skills" for Skilled Supporting Staff organised during 16-17 March, 2018. In all there were twenty two participants, from Vasad (19) and Kota (3). The training schedule for the two days include lectures from administration including cash and bills, leave rules and other issues of personal matters, stores, etc. while they are also being given soft skills for their expected jobs in farm viz. security, horticulture/forest/ crop management, engineering constructions and measurements.

Short Course Training programme for Skilled Supporting Staff was organised at institute head quarters Dehra Dun during 22-23 March 2018. Thirty Skilled Supporting Staff members participated in the training. The training with regards to administrative matters was imparted.

**Research Centre Kota Celebrated Foundation Day**

IISWC, Research Centre, Kota celebrated its 64th Foundation

categorically mentioned for development, adoption and dissemination of new technologies in a user friendly mode, to keep pace with advance researches being done elsewhere in the world.

#### Director, ICAR-IISWC Participated in Consultative Workshop

Dr P.K. Mishra, Director, ICAR-IISWC, DehraDun participated in consultative workshop titled “Expert Consultation Workshop on Hindu Kush Himalayan Mountain Soils” held at Kathmandu, Nepal during 20 to 21 March, 2018. The workshop was jointly organised by the International Centre for Integrated Mountain Development (ICIMOD) and Germany’s Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (BMUB). The main objective of the consultation workshop was to bring soil experts together from Hindu Kush Himalayan region to discuss about enhancing the soil function for mountain resilience and adaptation to climate change and initiated a collaborative project. The consultation process was on four thematic area viz; i) Carbon sequestration, ii) Infiltration and recharge services, iii) Nutrient provision and iv) Soil degradation and erosion. Dr. P.K. Mishra made a presentation on infiltration and recharge services.



#### भाकृअनुप भारतीय मृदा एवं जल संरक्षण संस्थान, देहरादून को “डॉ. नित्यानन्द कर्तव्य परायणता सम्मान”

उत्तरांचल उत्थान परिषद देहरादून द्वारा मेरा गाँव मेरा तीर्थ के अंतर्गत 28 जनवरी, 2018 को हेमवती नन्दन बहुगुणा केन्द्रीय विश्व विद्यालय, श्रीनगर, गढ़वाल में आयोजित ‘पलायन से बिखरती ग्राम व्यवस्था’ पर एक विचार गोष्ठी आयोजित की गई। गोष्ठी में मुख्य अतिथि माननीय श्री सतपाल जी महाराज, कबीना मंत्री, उत्तराखण्ड सरकार, कार्यक्रम अध्यक्ष डॉ० धन सिंह रावत, राज्य मंत्री उच्च शिक्षा, उत्तराखण्ड सरकार, और विशिष्ट अतिथि डॉ० मोहन सिंह रावत, निदेशक टी.एच. डी.सी एवं प्रो. ए.बी. भट्ट, कुलपति हे.न.ब. केन्द्रीय विश्वविद्यालय, श्रीनगर गढ़वाल थे। इस गोष्ठी में भा.कृ.अनु.प भारतीय मृदा एवं जल संरक्षण संस्थान, देहरादून द्वारा तहसील त्यूणी के सुदूर हटाल गाँव में क्रियान्वित जन-जातिय उप-योजना के प्रधान वैज्ञानिक डा० धर्मवीर सिंह ने भी भाग लिया। परियोजना में किए गए कार्य द्वारा गाँव के किसानों की आय बढ़ने से पलायन रुका, जिसकी सभी ने प्रशंसा की।



इस कार्य के लिए डा० सिंह को डा० नित्यानन्द कर्तव्य परायणता सम्मान माननीय श्री सतपाल जी महाराज, कबीना मंत्री, उत्तराखण्ड सरकार द्वारा प्रदान किया गया।

#### राष्ट्रीय उत्पादकता सप्ताह का आयोजन

अनुसंधान केन्द्र सेलाकुई, देहरादून, उत्तराखण्ड में राष्ट्रीय उत्पादकता सप्ताह (फरवरी, 12-18, 2018) के दौरान प्रक्षेत्र पर आगंतुकों को उन्नत कृषि तकनीकों से अवगत कराया गया। दिनांक 17.02.2018 को सहायक कृषि अधिकारी, कृषि विभाग, उत्तराखण्ड के 30 प्रशिक्षणार्थियों को उत्पादकता बढ़ाने हेतु उन्नत कृषि तकनीकों की वैज्ञानिक जानकारी से अवगत कराया। उत्तराखण्डके पहाड़ी व मैदानी क्षेत्रों में उपलब्ध संसाधनों के अनुरूप उत्पादन वृद्धि में सहायक बिन्दुओं पर विचार विमर्श किया गया। प्रशिक्षणार्थियों ने प्रक्षेत्र में प्रदर्शित तकनीकों का भी अवलोकन किया। मिनी वाटरशैड व रूफ वाटर हार्वेस्टिंग पर भी तकनीक प्रदर्शित करते हुए प्रकाश डाला गया। कृषि उत्पादन बढ़ाने के उद्देश्य से भारतीय मृदा एवं जल संरक्षण संस्थानए अनुसंधान केन्द्र, दतिया पर राष्ट्रीय उत्पादकता सप्ताह के आयोजन के संबंध में दिनांक 16.02.2018 को ग्राम जिगना एवं मुरेरा के लगभग 20 किसानों को केन्द्र पर वैज्ञानिक.कृषक गोष्ठी तथा प्रक्षेत्र भ्रमण का आयोजन किया गया। इस गोष्ठी में उनको इस क्षेत्र में कम वर्षा एवं जलवायु परिवर्तन के परिपेक्ष में कम सिंचाई जल की उपलब्धता के संदर्भ में कृषि उत्पादन बढ़ाने के विषय में विस्तृत चर्चा की गयी। इस अवसर पर किसानों को सूक्ष्म सिंचाई विधियाँ यरैन गनए स्प्रिंकलर एवं ड्रिपड्ड द्वारा कम पानी से अधिक क्षेत्रफल की सिंचाई द्वारा फसल, सब्जी एवं कृषि वानिकी तकनीकों को अपनाकर कृषि उत्पादन एवं आमदनी बढ़ाने के बारे में अवगत कराया और प्रक्षेत्र पर बिना पानी के अच्छी तारामीरा की फसल आवला आधारित कृषि वानिकी प्रायोगिक क्षेत्र का भ्रमण कराया।



#### सर्तकता जागरूकता सप्ताह

भाकृअनुप-भरतीय मृदा एवं जल संरक्षण संस्थान, अनुसंधान केन्द्र कोटा पर सर्तकता जागरूकता सप्ताह मनाया गया। सप्ताह के दौरान केन्द्र पर विभिन्न



कार्यक्रमों का आयोजन किया गया जिसके तहत दिनांक 31.10.2017 को केन्द्र के समस्त अधिकारियों एवं कर्मचारियों को सतर्कता शपथ दिलाई गई एवं सभी को दिन प्रतिदिन के कार्यों में भ्रष्टाचार उन्मूलन हेतु सजग रहने की सलाह दी एवं दिनांक 04 नवम्बर, 2017 को “मेरा लक्ष्य-भ्रष्टाचार मुक्त भारत” विषय पर एक कार्यशाला का आयोजन किया गया। उद्घाटन सत्र में डा. शाकिर अली, प्रधान वैज्ञानिक ने भ्रष्टाचार के कारण, और भारत का भ्रष्टाचार में विश्व में स्थान पर चर्चा की। श्री आदित्य चतुर्वेदी, सेवानिवृत्त अतिरिक्त पुलिस अधीक्षक ने भ्रष्टाचार उन्मूलन के नियम – कायदे पर विस्तृत रूप से जानकारी दी। इस विषय पर डॉ. अशोक कुमार, प्रधान वैज्ञानिक ने भारत में अनुसंधान संस्थानों में भ्रष्टाचार पर अपने विचार रखे तथा केन्द्र के अन्य अधिकारी/कर्मचारी द्वारा अपने विचार व्यक्त किये।

### कृषि शिक्षा दिवस मनाया गया

भाकृअनुप-भारतीय मृदा एवं जल संरक्षण संस्थान, अनुसंधान केन्द्र, कोटा में कृषि शिक्षा दिवस मनाया गया। इसमें संस्थान के वैज्ञानिकों ने विद्यार्थियों को कृषि शिक्षा की जानकारी दी। इस समारोह में जवाहर लाल नेहरू, राजकीय उच्च माध्यमिक विद्यालय, कोटा के विज्ञान संकाय के छात्र-छात्राओं ने बड़े उत्साह से भाग लिया। विद्यार्थियों को रोजगार के क्षेत्र में कृषि शिक्षा के महत्व एवं उपलब्ध अवसरों की जानकारी दी गयी। कृषि विद्यार्थी आगे चलकर कृषि वैज्ञानिक, कृषि अभियन्ता, बैंकर, पशु चिकित्सक, कृषि प्रबन्धन, कृषि पत्रकार, तकनीकी अधिकारी इत्यादि पद प्राप्त कर देश के विकास में महत्वपूर्ण योगदान दे सकते हैं।

### हिन्दी कार्यशाला का आयोजन

भाकृअनुप-भारतीय मृदा एवं जल संरक्षण संस्थान, अनुसंधान केन्द्र, चण्डीगढ़ में दिनांक 29.11.2017 को हिन्दी कार्यशाला का आयोजन किया गया। इस अवसर पर श्रीमति प्रिती सिंह, प्रध्यापक, हिन्दी राजभाषा, केन्द्रीय सदन, सैक्टर-9, चण्डीगढ़ ने कहा कि हिन्दी भाषा बोलने में सबसे अधिक सरल और लचीली भाषा है, जिससे समझना बहुत ही आसान है। श्री हरप्रीत सिंह, सहायक प्रबन्धक, हिन्दी अधिकारी, नेशनल इन्फोरेस कम्पनी चण्डीगढ़ ने हिन्दी के प्रयोग के लिए कम्प्यूटर पर ई-टूल के इस्तेमाल पर महत्वपूर्ण जानकारी देते हुए बताया कि गूगल डॉक्स एक बहुउपयोगी टूल है जिससे प्रतिदिन हिन्दी के कार्य को सुगमता से किया जा सकता है। कार्यशाला के दौरान उन्होंने सभी उपस्थित अधिकारियों को गूगल डॉक्स के प्रयोग का मोबाइल पर अभ्यास भी करवाया, जिससे इस टूल को इस्तेमाल करने में होने वाली कठिनाई को सुलझाया जा सके।

भाकृअनुप-भारतीय मृदा एवं जल संरक्षण संस्थान, अनुसंधान केन्द्र, कोटा पर “हिन्दी कार्यशाला” का आयोजन दिनांक मार्च 20, 2018 को किया गया। हिन्दी कार्यशाला में बोलते हुए डा0 आदित्य कुमार गुप्ता, राजकीय महाविद्यालय कोटा ने कहा कि देश की अखण्डता में साधक है-हिन्दी। हिन्दी बोलते व लिखते समय गर्व की अनुभूति होनी चाहिए।

भाकृअनुप-भारतीय मृदा एवं जल संरक्षण संस्थान, अनुसंधान केन्द्र, आगरा पर “हिन्दी कार्यशाला” का आयोजन दिनांक 29/2/2017 एवं मार्च 16/3/2018 को किया गया। इस अवसर पर डॉ0 आर एस तिवारी कवी, शिलेंद्र वशिष्ठ व श्रीमती पुनीता पचौरी, प्रोफेसर, के0हि0सं0, आगरा ने हिन्दी भाषा के बारे में अपने विचार प्रकट किये और कहा कि हिन्दी भाषा के माध्यम से ही एक दूसरे के साथ बेहतर तरीके से जुड़ने में आसानी होती है। इस भाषा का व्याकरण की काफी आसान है।

### AWARDS AND RECOGNITIONS

- ICAR-IISWC, DehraDun received *Swachhata Pakhwada* Award (For Institute Category-First Prize) of ICAR.
- Research Centre Udhagamandalam awarded second prize for Best Joint Programme Organizing in Hindi by Town Official Language Implementation Committee.
- Dr. R.S. Yadav conferred Fellow – 2017 by Indian Society of Agroforestry (ISAF), Jhansi.



- Dr. M. Muruganandam awarded Fulbright Visiting Scholar from the Fulbright Foreign Scholarship Board (FFSB), Washington D.C., USA and the United State India Education Foundation (USIEF), New Delhi, India.
- Dr. Shakir Ali awarded K.F. Antia Memorial Prize by The Institution of Engineers (India).
- Dr. J.M.S. Tomar conferred Dr. K.G. Tejwani Award by Indian Society of Agroforestry (ISAF), Jhansi.
- Dr. R. Kaushal conferred Gold Medal by Indian Society of Agroforestry (ISAF).
- Dr. Gopal Kumar secured First place in discus throw in ICAR – North Zone Sports meet at ICAR – IISR, Lucknow and ICAR – Inter Zone Sports meet at ICAR – NAARM, Hyderabad.
- Dr. Praveen Jaxhar and Dr. Ramanjeet Singh received IASWC – Young Scientist Award – 2017 by the Indian Association of Soil and Water Conservationists (IASWC), DehraDun.
- Dr. Indu Rawat received Young Scientist Award in a National Seminar organized by Samgra Vikas Welfare Society and Baba Bhimrao Ambedkar University, Lucknow.
- Dr. H.R. Meena received Life Time Achievement Award by Career Point University, Kota.
- Dr. G.L. Meena received Young Scientist Award by Career Point University, Kota.
- Dr. Ravi Dupdal awarded Ph.D degree by the University of Agricultural Sciences (UAS), Dharwad, Karnataka.
- Dr. Ch. Jyotiprava Dash and Er. Gaurav Singh awarded Merit certificates in four months certificate course on Soil & Water Conservation and Watershe Managem-ent at ICAR – IISWC, DehraDun.
- Dr. Gopal Kumar received best paper award in oral category in the National Seminar at Umiam, Meghalaya.
- Dr. P.P. Adhikary et al. received best paper award by SADHNA, Dr. Y.S. Parmar University of Horticulture & Forestry, Solan, Himachal Pradesh.
- Dr. V. Selvi received Best Research Paper Award by IASWC, DehraDun.

- Dr. Trisha Roy, Scientist received best Poster award by IASWC, DehraDun.
- Dr. Karma Beer received *Shrestha Rajbhasa Karmi* Award from Nagar *Rajbhasa Karyanayan Samiti*, Koraput.
- Dr (s). V.C. Pande, R.S. Kurothe, D.R. Sena, B.K. Rao, Gopal Kumar, A. Vishwakarma, Nyonand, G.L. Bagdi, M.L. Gaur, P.R. Bhatnagar received Best Paper Award by IASWC, DehraDun
- Dr (s). P.P. Adhikary, H.C Hombegowda, M. Madhu, G.B. Naik, and Nabeen Kumar Das received Best Poster Award by IASWC, DehraDun.
- Dr (s). M. Madhu, P. Adhikary, D.C. Sahoo, Ch. Jyotiprava Dash, H.C. Hombegowda, Praveen Jakhar, G.B. Naik, Karma Beer, G.W. Barla, M.K Meena, S. Kindal and Nabin Kumar Das received Best Poster Award by IASWC, DehraDun.

## IMPORTANT PUBLICATIONS

### Research Papers

- Adhikary, Partha Pratim; Hombegowda, H. C; Barman, D; Jakhar, P; Madhu, M (2017) Soil erosion control and carbon sequestration in shifting cultivated degraded highlands of eastern India: performance of two contour hedgerow systems. *Agroforestry Systems* 91: 757–771.
- Ahmed, A; Tomar J. M. S; Mehta, H; Kaushal R; Deb, Dibyendu; Chaturvedi O. P and Mishra, P.K (2017) Throughfall, stemflow and interception loss in *Grewia optiva* and *Morus alba* in north west Himalayas *Tropical Ecology* 58(3): 1–12
- Biswas, S.S; Singhal, S.K; Biswas, D.R; Singh, R.D; Roy, T; Sarkar, A; Ghosh, A and Das D (2017) Synchronization of Nitrogen Supply with Demand by Wheat Using Sewage Sludge as Organic Amendment in an Inceptisol. *Journal of the Indian Society of Soil Science* 65: 264–273.
- Chand, L and Puniya, R (2017). Bio-efficacy of alone and mixture of herbicides against complex weed flora in wheat (*Triticum aestivum*) under sub-tropical conditions. *Indian Journal of Agricultural Sciences* 87 (9): 1149–1154.
- Chaudhary, VP; Parmanik, M and Patel, Anurag (2017) Effect of conservation tillage and crop residue management on soil physical properties and crop productivity of wheat. *Agricultural Mechanization in Asia, Africa and Latin America* 48 (4): 62–70.
- Das, Debarup; Nayak, A.K; Thilagam, V.K; Chatterjee, Dibyendu; Shahid, M; Tripathi, Rahul; Mohanty, S; Kumar, Anjani; Lal, B; Gautam, P; Panda, B.B and Biswas S.S (2018) Measuring potassium fractions is not sufficient to assess the long-term impact of fertilization and manuring on soil's potassium supplying capacity. *Journal of Soils and Sediments* (Online). DOI 10.1007/s11368-018-1922-6.
- Dash Ch. J; Adhikary P.P; Madhu, M; Mukhopadhyay S; Singh S.K; Mishra P.K (2018) Assessment of spatial changes in forest cover and deforestation rate in Eastern Ghats

Highlands of Odisha. *Journal of Environmental Biology* 39(2), 196–203.

- Hameed, A; Raja, P; Ali, M; Upreti, N; Kumar, N; Tripathi, J.K; Srivastava, P (2018) Micromorphology and Clay mineralogy of Palygorskite bearing calcic-soils from Western Thar Desert: Implications for late Quaternary monsoonal fluctuations. Published online, *Catena*, DOI/10.1016/j.Catena. 2017. 12.034. C029.
- Kaushal, R; Jayaparkash, J; Mandal, D; Kumar Ambrish; Alam N. M; Tomar, J. M. S; Mehta, H and Chaturvedi O. P (2018) Canopy management practices in mulberry: impact on fine and coarse roots. *Agroforestry Systems* DOI 10.1007/s10457-017-0148-8.
- Mishra, C. D; Tiwari, Y.K; Nema R.K; Nema, A. K; Singh Gaurav and Kumar Rajesh (2018) Effect of irrigation sources on yield of wheat crop in selected canal command area of Rani Avanti Bai Sagar irrigation project. *Journal of Agro- metrology*, 20 (Special Issue-1): 58–62.
- Mitra, S; Ghosh S; Satpathy, K.K; Bhattacharyya, B.D; Sarkara, S.K; Mishra Pravakar and Raja P (2017) Water quality assessment of the ecologically stressed Hooghly River Estuary, India: A multivariate approach. *Marine Pollution Bulletin*, DOI/10.1016/j.marpolbul. 2017.09.053.
- Pande, V. C; Kurothe, R. S., Kumar, Gopal; Singh, H. B. and Tiwari, S. P. (2018) Economic assessment of agri-horticulture production production systems on reclaimed ravine lands in Western India. *Agroforestry Systems* 92(1): 195–211.
- Patil S.L and Ramesha M.N (2018) Impact of improved production technologies on chickpea yields, economics and energy use in rainfed Vertisols. *Legume Research* 41(1): 79–86.
- Roy, T; Biswas, D.R; Datta, S.C; Sarkar, A and Biswas, S.S (2018) Citric acid loaded nano clay polymer composite for solubilization of Indian rock phosphates: A step towards sustainable and phosphorus secure future. *Archives of Agronomy and Soil Science* DOI/10.1080/ 03650340. 2018.1444275.

## BOOKS

### Technical bulletin//Policy papers/ Souvenir/ Compendium

- Arya S.L; Tiwari A.K and Mishra P.K (2018) Ensuring people's participation for successful implementation of watershed development projects in Shivalik foothill region. Policy Paper. IISWC, Dehradun
- Dubey, R.K; Dubey, S.K; Pal, Rama; Bhusan, L.S; Yadav, R.C and Gawande, A.P (2017) Appraisal on soil and water conservation interventions in Agra watershed. Technical Bulletin No.TB-01/AE2016, ICAR-IISWC, Research Centre, Agra, Uttar Pradesh, India. 61 p.



Manivannan, S; Thilagam, V.K; Regupathy, R; Kholo O.P.S (2017) Artificial recharge techniques for enhancing ground water (In Tamil) – Technical Brochure. ICAR-IISWC, RC, Udthagamandalam.

Naik, B. S; Hombegowda, H.C; Madhu, M and Sudhishri, S (2017). *Sumo ghasara abarodha purbaghata malaanchalare mrutika o jalasamrakshyana pain eka upajukta upaya* (Sambuta - A suitable vegetative barrier for soil and water conservation in sloping highlands of Eastern Ghats region) (In Odiya language). ICAR-IISWC, RC, Sunabeda, Koraput, Odisha: 4p.

Raizada, A; Biswas, H; Kumar, S; Naik, B.S; Patil, S.L; Morade, A.S; Prabhavathi, M; Ojasvi, P.R; Dogra, P and Shrimali, S.S (2017) Manual of process monitoring for implementation of Sujala watershed projects. Watershed Development Department, Government of Karnataka and ICAR-IISWC, Research Centre, Ballari. 46p.

Sahoo, D.C; Naik, B.S. and Madhu, M (2017) *Jaibayantika padhhatire purbaghata parbatyaanchalara gadania jamire mrutika kshyayara niyantrana* (Bio-engineering measures for soil erosion control in sloping highlands of Eastern Ghats region) (In Odiya language). ICAR-IISWC, RC, Sunabeda, Koraput, Odisha: 4p.

Sharma K.K; Singh A.K and Dubey S.K. (2017) Dugout farm pond- A potential rain water harvesting structure in ravines of central India. Technical Bulletin No.TB-02/AE2017, ICAR-IISWC, Research Centre, Agra, Uttar Pradesh, India. 26 p.

Sharma, N. K; Bhatnagar, P.K; Subbaiah, R; Kumar, A; Mandal, D; Kaushal, R; Kumar, G; Dinesh, D; Kakade, V and Meena, O.P (2018) Souvenir of Conference on Farmers First for Conserving Soil & Water Resources in Western Region (FFCSWR-2018). Indian Association of Soil and Water Conservationists, Dehradun.

Sharma, N. K; Dinesh, D; Bhatnagar, P.K; Subbaiah, R; Kumar, A; Mandal, D; Kaushal, R and Kumar, G (2018) A Compendium of Abstracts of Conference on Farmers First for Conserving Soil & Water Resources in Western Region (FFCSWR-2018). Indian Association of Soil and Water Conservationists, Dehradun.

Singh, C; Dwivedi V. K and Mehta H (2018) Calendar on the most important multipurpose tree species suitable for soil conservation and watershed management.

Singh, C; Mehta, H; Tomar, J. M. S; Rathore, A. C; Kaushal, R; Jayaprakash, J; Singhal, V,, Raj Kumar and Dwivedi V. K. (2018) Conservation Forestry and Horticulture. Technical Resource Book. 364 p. Indian Institute of Soil and Water Conservation, Dehradun. ISBN No.978-81924624-1-7.

#### FOREIGN VISITS

- Dr. P.K. Mishra, Director attended the Joint Consultation workshop on Hindu-Kush Himalayan Mountain Soils at ICIMOD, Kathmandu, Nepal from March 20 – 21, 2018.Nepal.

- Dr. M. Muruganandam, Sr. Scientist (Fisheries Resource Management) visited USA- South Dakota State University; University of Maryland Eastern Shores (UMES), University of Illinois; Oregon State University (OSU); Marymount University (LMU); University of Idaho, Boise; *Monroe Community College (MCC), Rochester* under Fulbright Visiting Scholar program from August 2016 to February 2018.

- Dr. M. Sankar, Scientist (Soils) participated in Global Challenges Research Fund collaborative project preparation workshop at University of Reading, U.K. from March 13 – 14, 2018.

#### WORKSHOPS/TRAININGS/VISITS/DAYS/WEEKS/MEETS ORGANISED

##### Agra

- *Swaccha hi Sewa hai* sponsored by PPVFRA, New Delhi on October 17, 2017.
- Pre *Rabi Kisan Gosthi, Surehra* on October 24 and 26, 2017.
- Practical field training on Soil and Water Conservation Measures at Keola Deo National Sanctuary Bharatpur Rajasthan from December 20 – 21, 2017.
- Exposure visits of B.Tech (Ag. Engg) Final year students from CAET, AAU Godhra (Gujrat) on January 17, 2018.
- Practical training for 60 Forest Officers of Dholpur, district Rajasthan from February 26 – 27, 2018.
- *Hindi Workshop* on December 29, 2017 and March 16, 2018.
- Exposure visits of 139 farmers from Tikamgarh, Gwalior M.P. under *Mukh Mantri Trith Yojna*, Gwalior, M.P.

##### Ballari

- *Swacchata hi Seva* from September 15 – October 1, 2018.
- Organized *Swacchh Bharat* Quiz and celebrated Mahatma Gandhi Jayanti on October 1, 2017.
- World Rural Women's Day on October 15 and World Food Day on October 16, 2017 at Lakshminagar camp, Ballari district.
- Interactive Workshop on Establishment of Common platform for Monitoring and Evaluation Agency (M&E), Land Resource Inventory partners (LRI) and Implementing Agencies of Sujala-III Watershed on November 7, 2017.
- Quinquennial Review Team (QRT) meeting from January 29 – 31, 2018.
- Cleanliness drive and awareness campaigns at Hanmapura, Karekal, K. Veerapura, Netranhalli, Vittahlapur, Chelagurki, Main Office, Research farm, Residential colony and surrounding areas.
- Cleanliness drive and awareness programme among the tourists at tourist place at Dr. Rajkumar Park, Ballari and Sh. Basvanna Temple at Shridhargadda.

### Chandigarh

- Awareness cum training programme under *Mera Gaon Mera Gaurav* (MGMG) on October 31, 2017.
- Study tour of officer trainees of 117<sup>th</sup> batch from IISWC, Dehradun from November 19–22, 2017.
- Exposure visit of 60 Members of DWDA from DWDA Krishngiri, Tamil Nadu on March 7, 2018.

### Datia

- Scientists-Farmers interaction meeting and farm visit for farmers from village Jigna and Murera on February 16, 2018.
- Participated in exhibition on Fodder Technology and Machinery Demonstration Meet at ICAR – IGFRI, Jhansi on February 16, 2018.
- Participated in exhibition in *Unnat Krishi Takniki Pradarshani Evam Kisan Sammelan* at ICAR – IGFRI, Jhansi on February 27, 2018.
- Training on Soil and water Conservation for farmers from villages Jaygram, Murera, Moheba, Jigna, chopda, Dang, Karera, Tewaripura and Imlia from March 8–14, 2018.

### DehraDun

- *Swachhta hi Sewa* programme on October 1 – 2, 2017 at Sahastradhara and Badasi village, Raipur Block, Dehradun.
- Training on Appropriate Method for use of Hydrogel in Rainfed Wheat in the adopted villages under Farmer First project on October 24, 2017.
- All India Seminar on Scientific Mining of Reverbed Material and Environmental Impact in Hilly and Foot-hill region from October 24–25, 2017.
- Observed Vigilance Awareness Week from October 30, 2017 to November 4, 2017
- Four months regular training on Soil & Water Conservation and Watershed Management from October 9, 2017 – February 8, 2018.
- Training Workshop on Methodological Framework for Implementation of FFP from November 6–9, 2017.
- Animal Health Camp at village Bhagwanpur and Koti Mechak, Raipur Block under Farmer FIRST Project from November 28–29, 2017.
- World Soil Day on December 5, 2017.
- Training course on Soil and Water Conservation sponsored by Uttar Pradesh Bhoomi Sudhar Nigam, Lucknow from December 11–16, 2017.
- Administrative staff training on PFMS and procurement from December 18–22, 2017.
- Quinquennial Review Team (QRT) meeting for Divisions and Research Centre Chandigarh from December 19–20, 2017.
- Training programme under *Mera Gaon Mera Gaurav* at Phateu and Ichhla village of Kalsi Block, Dehradun on January 2 and 6, 2018.

- Training programme on Application of Electrical Resistivity Meter (ERM) in Groundwater Exploration on January 5, 2018.
- Animal Health Camp for Boxa tribe at Shahpur on January 22, 2018.
- Sensitization programme on Vegetable Production and Natural Resource Management at Shahpur – Kalyanpur on January 23, 2018.
- Participated in Exhibition at FFCSWR-2018, at AAU Gujarat from February 1–3, 2018.
- Training on Horticulture Based Alternate Land Use System under Farmer First project from February 2–3, 2018.
- National Productivity Week from February 12–18, 2018.
- Training on Vegetable Cultivation Techniques under TSP from February 26 – 28, 2018 for boxa tribal of Judli – Kalyanpur and Shahpur.
- International Training on Soil and Water Conservation and Watershed Management from March 6–20, 2018.
- Research Advisory Committee (RAC) meeting on from March 6-7, 2018.
- All India Seminar on Hi-Tech cultivation of vegetables and flowers jointly organized with the Institutions of Engineers (India) and Horticulture Department, Uttarakhand from March 10–11, 2018.
- Field Day under Farmers First Project at Raipur Block of Dehradun on March 24, 2018.
- Food Processing and *Kisan Sampada Yojna* in collaboration with ASSOCHAM, New Delhi on March 13, 2018.
- *Krishi Unati Mela cum Kisan Gosthi* at village Udpalta on March 17, 2018.
- Participated in Annual *Krishi Unnati Mela* at Mela ground, IARI, Pusa, New Delhi from March 16–19, 2018.

### Koraput

- *Swachha hi Seva* Programme at public tourist place i.e. Upper Kolab on October 1, 2017.
- Participated in Science Exhibition at Govt. High School Dudhari of Semiliguda Block on October 20, 2017.
- Vigilance Awareness Week from October 30 – November 4, 2017.
- Training on Rainwater Conservation Techniques for Enhancing Crop Productivity at Jharaput and Rajput villages in Semiliguda Block of Koraput District under *Mera Gaon Mera Gaurav* (MGMG) from November 23–24, 2017.
- Agricultural Education Day on December 3, 2017.
- Workshop on Doubling Farmer's Income on December 1, 2017.
- World Soil Day in collaboration with Department of Agriculture, KVK, Department of Horticulture at Jeypore, Koraput on December 5, 2017.



- Training programme on Utilization of Crop Residues for Mushroom Cultivation under TSP on January 17, 2018.
- Training programme on Inputs and Water Management Techniques for Enhancing Vegetable Productivity under *Mera Gaon Mera Gaurav* on February 7, 2018.
- Training programme on Impact of Shifting Cultivation and Rainwater Conservation Techniques for Enhancing Crop Productivity on February 22, 2018.
- Farm Innovators Day (FID) – 2018 on February 28, 2018.
- Quinquennial Review Team (QRT) meeting from March 4 – 5, 2018.
- Participated in State Level Exhibition (Krushi Odisha – 2018) organized by Agriculture & Farmer's Empowerment Department, Govt. of Odisha from March 6 – 9, 2018.
- Capacity building program on Water Harvesting, Sharing and Efficient Utilization under Tribal Sub Plan on November 18, 2017.
- Training for tribal farmers on Value addition in Plantation Crops and Vegetables in The Nilgiris at Nattakkal village, Kotagiri, Taluk, The Nilgiris on November 25, 2017.
- Training for tribal farmers on Organic farming practices for plantation and vegetable crops in The Nilgiris at Baviyur village, Kotagiri, Taluk, The Nilgiris on November 28, 2017.
- Participated in Exhibition in the MAATRAM 2017-A green expo held at HADP hall, Ooty from November 30 – December 1, 2017.
- Training cum exposure visit for B.E. (Agrl. Engg.) Students from Sri Shakthi Institute of Engineering and Technology, Coimbatore from December 4 – 9, 2017.
- One day capacity building program on Water Harvesting, Sharing and Efficient Utilization under Tribal Sub Plan December 05, 2017.
- Training cum exposure visit for 36 BE (Agrl. Engg.) Students from Sri Shakthi Institute of Engineering and Technology, Coimbatore from December 11 – 16, 2017.
- Institutional Training for B. Tech. Agricultural Engineering students from College of Agricultural Engineering, Kumulur, TNAU Tamil Nadu from September 4 – December 2, 2017.
- Quinquennial Review Team (QRT) meeting from January 26 – 27, 2018.
- Five no's of 3 days capacity building programme on Participatory Watershed Development, Farm Production and Livelihood Support Systems for farmers and Watershed Development Team Members from Marakkanam Block, Villupuram District, Tamil Nadu from March 12 – 28, 2018.
- World Soil Day celebrated at Neelampathy Village, Coimbatore district on December 5, 2017.
- Participated in National Science day Exhibition organized at Tata Institute of Fundamental Research, Ooty on February, 28, 2018.

### Kota

- *Swachh Bharat Abhiyan* (SBA): *Sarowar talab* tourism spot *Swacchta Divas* on Oct. 1, 2017.
- 64<sup>th</sup> Centre's Foundation day on Oct. 18, 2017.
- Vigilance awareness week from October 31 – November 5, 2017.
- Six trainings organized in the *Mera Gaon Mera Gaurav* (MGMG) villages viz, Ardana, Narsinghpura, Amli, and Charadan (Baran District) and Kanhihera, Jhakana, Piplaiya, Manditiya and Delunda of Bundi district from March 5 – 6 and 8 – 9, 2018
- Scientist-farmer interaction meeting between scientists from ICAR-IISWC, RC, Kota and stakeholders of SCSP & TSP programme at the office of Kurel Cooperative Society, Jakhana

### Udhagamandalam

- *Swacchta hi Seva* from Septemeber15 – October 9, 2017.
- Training on Data entry under PFMS for the Officers and staff of Centre from October 7 – 10, 2017.
- Participated in the 3<sup>rd</sup> Indian International Science Festival Expo – 2017 held at Anna University, Chennai from October 13 – 16, 2017.
- Training cum exposure visit for tribal farmers under TSP on Soil and Water Conservation Measures for Plantation Crops and Vegetables in The Nilgiris on October 25, 2017.
- Training cum exposure visit on Soil Conservation and Watershed Management for Foresters from Tamil Nadu Forest Training College, Vagai Dam from October 30 – 31, 2017.
- Training cum exposure visit on Soil Conservation and Watershed Management for Foresters from TNFA, Coimbatore from November 6 – 7, 2017.
- ICAR sponsored winter school on Advanced Technologies in Natural Resource Management to Mitigate Climate Change Impacts from November 9 – 29, 2017.

### Vasad

- In-plant training on Soil and Water Conservation and Water Management for 4 final year B. Tech students from College of Agricultural Engineering & Technology, Rahuri, Maharashtra.
- Conference on Farmers First for Conserving Soil & Water Resources in Western Region in collaboration with Indian Association of Soil & Water Conservationists at Anand Agricultural University from 1 – 3 February 2018.
- Participated in Exhibition in the conference on Farmers First for Conserving Soil & Water Resources in Western region (FFCSWR 2018) at Anand Agricultural University, Anand, Gujarat from February 1 – 3, 2018.

- Participated in exhibition in 25<sup>th</sup> National Children Science Congress, 2017 held at Ahmedabad from December 27 – 30, 2017.
- Agriculture Education Day on December 4, 2018.
- Vigilance awareness week observed from October 31 – November 5, 2018.

#### TELEVISION/RADIO TALKS

- Dr. R.K. Singh delivered radio talk on Improved Practices of Water Management at All India Radio, Kota on October 24, 2017
- Dr. K. Rajan, Principal Scientist delivered radio talk on Soil Management for Hill Crops of the Nilgiris at All India Radio, Udhamandalam on October 30, 2017.
- Dr. Harsh Mehta delivered radio talk on *Rabi me Surajmukhi Ki Kheti* at Prasar Bharati Aakashvani, DehraDun recorded on November 16, 2017
- Dr. Ambrish Kumar, Principal Scientist delivered a Radio Talk on *Jal Sarakshan ki Aadhunik Vidhiyan Evam Mehtav* at Prasar Bharati Aakashvani, Dehradun on November 28, 2017.
- Sh. D. M. Kadam delivered Radio talk on *Sardi Ke Mausam Me Bag Bagicho Ki Dekhbhal* at Prasar Bharti DehraDun on December 15, 2017.
- Dr. G.L. Meena delivered radio talk on *Rabi Phaslon Me, Paudh Sanrakshan Karya* at All India Radio, Kota on January 19, 2018.
- Mr. A.K. Gupta delivered Radio talk on *Krishi main Paani Ka Mehtav* at All India Radio, DehraDun on March 22, 2018.

#### DISTINGUISHED VISITORS

##### Ballari

Dr. Pratap Narain, Chairman QRT; Dr. G.R. Maruthi Sankar; Dr. S.P.S. Kushwaha; Dr. M.V. Rangha Swami; Dr. B.D. Behera - Members QRT.

##### Chandigarh

Dr. J.S. Samra, Ex-CEO, NRAA; Sh. Chhabilendra Roul, Additional Secretary, DARE & Secretary, ICAR; Sh. R.P. Singh, Governing Body Member, ICAR; Dr. K.P. Sharma, VC, CCSHAU, Hissar; Dr. D.R. Thakur, Associate Director, CSK HPKV, Bajaura, Kullu; Dr. D.S. Ananth, Governing Body Member, ICAR & MP; Sh. H.S. Dhaliwal, Governing Body Member, ICAR & MP; Dr. S.K. Jain, Regional Director, CGWB, Jaipur; Dr. U.N. Roy, Professor, NNTTI, Chandigarh; Dr. A.K. Tiwari, Former Head, ICAR-IISWC, RC, Chandigarh.

##### DehraDun

Dr. Alagusundaram, DDG (Engg. & NRM), ICAR-New Delhi; Dr. V.N. Sharda, Ex- Member ASRB, N. Delhi; Dr. Savita, Director, FRI, Dehradun, Dr. V. P. Chahal, ADG (Agriculture Extension),

ICAR-New Delhi; Dr. Pratap Narain, Chairman QRT; Dr. G.R. Maruthi Sankar; Dr. S.P.S. Kushwaha; Dr. M.V. Rangha Swami; Dr. B.D. Behera- Members QRT; Dr. M.N. Jha, Ex-Head Soil Science Division, FRI; Dr. M.C. Nautiyal, Ex-Dean, College of Forestry and Horticulture, Ranichauri; Dr. D.S. Rana, Emiretus Scientist, IARI, New Delhi; Dr. R.L. Shyani, Ex Professor and Head (Ag. Economics); Dr. R.K. Panda, Head, School of Earth, Ocean and Climate Sciences, IIT Bhubneswar; Sh. Matbar Singh Kandari, Member RAC.

##### Koraput

Members QRT – Dr. SPS Kushwaha; Dr. V M Ranghaswami; Dr. GR Maruthi Sankar; Dr. Basudev Behera; Dr. S.S. Singh, ICAR – ATARI Kolkata; Prof. P.K. Roul Dean Extension Education, OUAT, Bhubaneswar; M. Palanisamy Dhan Foundation, IA, Vaidyanathapuram East, Madurai, Tamil Nadu; Dr. P.S. Brahmanand, ARS, Principal Scientist, ICAR – IIWM, Bhubaneswar.

##### Kota

Dr. Amar Pal, Head, ICAR-IVRI, Izatnagar, Bareilly; Dr. Bharat Prakash Meena, Scientist, ICAR-IISC, Bhopal; Dr. P.G. Patil, Director, ICAR-CIRCT, Matunga, Mumbai; Dr. Sanjeev Kumar Verma, ICAR-CIRC, Meerut; Dr. Shiv Pratap Singh, Pr. Scientist, ICAR-CPRI, RC, Gwalior; Dr. Vijay Singh Beniwal, Professor, Haryana Agriculture University, Hisar.

##### Udhagamandalam

Dr. Wangdop Bhutia, IFS, Principal, Central Academy of forest education, Darjeeling; CAFÉ, RFO, Trainees, Coimbatore; Dr. Raviraj, TNAU, Tamil Nadu; Ms. Innocent Divya, IAS, Collector, Nilgiris, Tamil Nadu; Sh. S. Kalanithi, DFO, The Nilgiris, Tamil Nadu; Dr. V. Geethalakshmi, Prof. TNAU; Mr. S.B. Thampi, Dy. DGM (IMD) and Head, RMC, Chennai; Sh. Amar Kushawha, IAS, Project Director, HADP, Ooty; Dr. L. Vijaya Bharathi, Professor, ANGRAU, AP; Sh. K. Mohanan, Asst. Dir. Of Agri. Moovatupuzha, Kerala; Kundal Forest Academy, Maharashtra; Sh. Jitendra Kumar, AEC&RI, Kumulur, Trichy (TNAU).

##### Vasad

Prof. B.C. Mal, Vice Chancellor, Director JIS University, Kolkata visited the farm on 8 February 2018.

#### PERSONALIA

##### Appointments

Dr. Madan Singh, Scientist (Agril. Extension) joined HQ DehraDun.

*Sh. L.S. Rawat joined IISWCRC Koraput as AAO.*

Sh. Inder Singh Chauhan, Sr. Tech., joined IISWC DehraDun from IISR Lucknow.



Promotions

Dr. K. K. Sharma promoted to Principal Scientist (SWCE).
Dr. Rajesh Kaushal promoted to Principal Scientist (Forestry).
Dr. B. L. Mina promoted to Principal Scientist (Soils).
Dr. D.C. Sahoo promoted to Principal Scientist (LWME).
Smt. T. Padmaja Gupta promoted to AAO.
Sh. K. Nataraj promoted to Administrative Officer at ICAR-IISS, Calicut (Kerala).
Md. Irfan, promoted to the post of AF&AO at ATARI, Jodhpur

Sh. M. Balakumar, Technial Officer from IISWC RC Chandigarh to IISWC Ballari.
Sh Mangalu, S.S.S. from IISWC RC Koraput to IISWC RC, Agra.

Transfers

Dr. A.K.Singh, Principal Scientist from IISWC RC Agra to IISWC RC Kota.
Sh. Krishan Kumar, Technical Officer from IISWC RC Datia to IISWC RC Agra.
Sh. M. K. Meena, Scientist (Agri. Economics) from IISWC RC Koraput to IISWC RC Datia.

Retirements

Dr. B.L. Dhyani, Senior Scientist; Sh. A. K. Singh, Chief Administrative Officer; Mrs. Saroj Semwal, Asstt. Admn. Officer; Sh. Rakesh Singh, SSS; Sh Brajesh Kumar, Technical Officer; Sh. Sorti Lal, SSS; Mr. N.K. Sharma, Sr.Technical Officer; Sh. A. K. Chaturvedi, Technical Assistant; Sh. Kripal Singh, SSS; Smt. D. Fathima Bi, SSS; Sh. Ramesh Singh, SSS,

Obituaries

Sh. B.K. Upadhayay, Sr. Technical Officer; Sh. P.S. Sharma Technical Officer
IISWC family expresses heartfelt condolences to the bereaved families.

IN NEWS



**TECHNOLOGY****Spring Water Harvesting System – A Sustainable Solution for Water Resource Development in Hilly Areas**

In India, most of hilly regions present a paradoxical situation of scarcity amidst plenty on water front. Though sufficient rainfall is received in most parts of different hilly regions during monsoon season, majority of it flows down steep slopes as runoff and is not available for practical use. Water harvesting plays a key role in the hills. In some places of Himalayas, traditional water harvesting systems of *Naula, Khal, Hauj, Guhl* etc. are still in place to meet domestic, livestock and irrigation needs. But *there are inherent demerits and limitations. There are a few other sources of irrigation in the hills like lift irrigation through electric motor or hydraulic ram, but their wider applicability is limited due to high cost and other geographical constraints. Presently in Uttarakhand State, only 10-12% agricultural lands are irrigated in hill districts. Therefore, agriculture in this hilly region is largely rainfed, subsistence or there is not much surplus for market. As a result, most of able-bodied men have migrated to other places in search of employment, and in many cases, only women are left for looking after their farms. In many micro-watersheds of Himalayan ecosystem, water surplus exists due to natural water conservation mostly because of presence of thick vegetation and porous soil in upper reaches of catchment area, which gives rise to perennial springs.* Springs are manifestations of the groundwater hydrology of mountainous regions. **Increased water demand can be met to a greater extent by community based adoption of spring water harvesting technology. This technology is recommended for those hilly areas where untapped perennial source of water (e.g. spring) is situated at higher elevation than a common place of storage in a targeted village so that water can be transported through low cost pipeline under gravity. Use of HDPE pipes in transportation and silpaulin sheet for lining of storage structures have been observed to be a cost effective and sustainable solution, if participatory approach is adopted with effective local leadership.** Inter-watershed water transfer through HDPE pipe line technology has been recently demonstrated in Hattal and Sainj villages of Dehradun district by ICAR-Indian Institute of Soil and Water Conservation (IISWC), Dehradun under its Tribal Sub-Plan (TSP) programme. These remote villages belong to *Jaunsar* Tribal region of Uttarakhand in middle Himalayas. This hilly region is socio-economically backward and suffers from severe land degradation and water scarcity problems. About 325 households inhabit these villages and more than half of them are engaged in crop cultivation.

Traditionally, cereals, pulses, vegetables and fruits are cultivated in these villages under rainfed condition. Based on detailed field survey, technological interventions, spring water harvesting in particular, were taken-up in participatory mode. Farmers adopted cultivation of off-season vegetables - tomato, cauliflower, sweet peas, capsicum, etc. with assured irrigation facility developed by inter-watershed water transfer based spring water harvesting by laying gravity fed HDPE pipe line. Presently, a total of 670 m<sup>3</sup> water is available to these farmers in 24 hours in the two villages, which has led to 3.17 times increase in net irrigated area. A total of 165 farmers were initially associated with these interventions of participatory water resource development in Hattal and Sainj, who had adopted the cultivation of off-season vegetables in about 33.3 ha area with assured irrigation facility developed in their villages. After four years of project period, during 2017, these farmers produced tomato, cauliflowers and other vegetables worth Rs 411.08 lakhs, and average family income from agriculture rose to 7.71 times. In these villages, before this project a total of only 34 families were engaged in agriculture, which has increased to 99 (2.91 times). Reverse migration of 12 families has been observed in Sainj village where number of farmers had abandoned their fields due to scarcity of water.



Developed water resource in Sainj



Cauliflower grown with harvested water

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