A Report on training course on Groundwater issues of Punjab with special emphasis on groundwater salinity during July 16 - 18, 2019 at Forest Complex, Mohali under NHP

Groundwater Hydrology Division of National Institute of Hydrology, Roorkee organized a 3-day training course on "Groundwater issues of Punjab with special emphasis on groundwater salinity" during July 16 - 18, 2019 at Forest Complex, Mohali (Plate. 1) under NHP to the Engineers, Officers, Hydrogeologists and Scientists of Government of Punjab. A total of 34 participants attended the course (Plate 2)

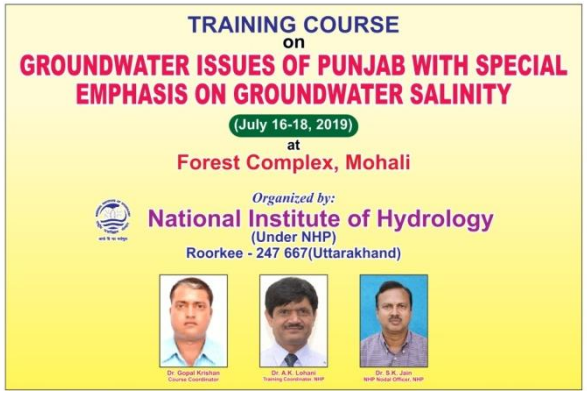

Plate. 1, Information of training course

Plate. 2, Group photo of training course

Motivation

Groundwater sustainability has been in jeopardy as a result of rapid pace of agricultural development, industrialization and urbanization which have resulted in the overdevelopment and contamination of groundwater resources. During the last 4 decades, Punjab state has adept a spectacular increase in agricultural production practicing rice-wheat cropping system with convinced irrigation facilities, leading the country in achieving food-sufficiency. This led to manifold increase in the irrigation water demand which resulted in depletion of groundwater level in the most parts of the state at an alarming rate. Many districts of Punjab show 100% or even greater levels of exploitation and the same is exhibited by a secular decline in pre-monsoon water tables except for extremely wet years.

To some extent the irrigation requirement are fulfilled by introduction of canal irrigation which has led to the development of water logging and subsequent salinization rendering large chunks of fertile land unproductive mainly in the south-western part of Punjab. Other factors such as improper alignment of canals, seepage flow canals and distributaries, drainage congestion, brackish quality of groundwater, nature and properties of soil, faulty irrigation practices and cultivation of water intensive crops etc. have also contributed to the problem of water logging. The problem is further compounded by natural factors such as existence of topographic depression and impervious layer near the land surface, absence of natural drainage and incessant rains.

The water-logging and deteriorating ground water quality of southwest Punjab, India has affected an area exceeding 200 km2 (CGWB, 2008). The reasons for this are considered to be due to inadequate drainage system, excess application of irrigation water, non-exploitation of groundwater resource and

excessive use of pesticides. The increasing groundwater salinity is reducing the availability of fresh water for drinking and irrigation needs. More than 75 km2 area has become saline (CGWB, 2008). This is also affecting the crop production. The origin of salinity in soils and in groundwater in shallow and deeper aquifers and its growth in space and time is not well understood.

Present course was proposed by Department of Water Resources, Punjab and similar concerns were raised by other concerned departments in Punjab such as: Department of Agriculture and Farmers Welfare, Punjab State Farmers Welfare and Farmers Commission. Keeping this in view, training course on the topic "Groundwater issues of Punjab with special emphasis on groundwater salinity" is being organized by National Institute of Hydrology, Roorkee under National Hydrology Project.

Objectives

In order to exchange ideas and give scientific and technological knowledge on salinity assessment, its low cost remediation this 3-day training course was organized for the Punjab government staff in particular.

The main objectives of the course are to:

- Acquaint the participants with agriculture status, groundwater issues, salinization processes, causes and remediation
- Provide the participants with knowledge on salinity assessment and saline water management under Punjab conditions in particular
- Highlighting the tools for assessment of salinity by RSGIS and isotope methods
- Experience of NIH working in Punjab through case studies

Inauguration

The training course was inaugurated by Er. K.S. Takshi, Chief Engineer (Retired), Water Resources Department, Punjab. The other dignitaries present during the inauguration were Er. C.P. Kumar, Scientist G and Head, GWHD; Dr. Sanjay Jain, Scientist G and Head, WRSD, Nodal officer, NHP; Dr. Anil Kumar Lohani, Scientist G, SWHD and training coordinator, NHP; Sh. Rajesh Vashist, Joint Director, Agriculture; Prof. C.S.P. Ojha, Department of civil Engineering, IIT-Roorkee, Er. H.S. Arora, Chief Engineer, Water Resources Department, Punjab. (Plate. 3)

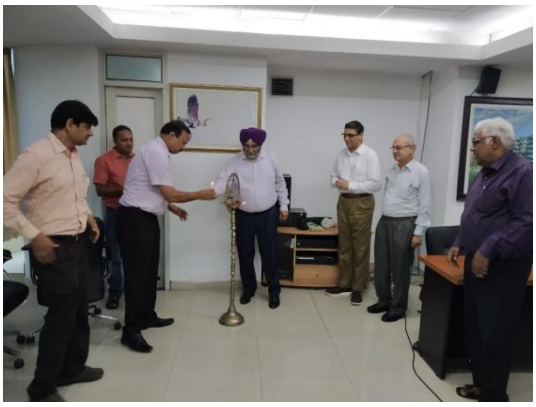

Plate. 3, Information of training course

Plate. 4, General introduction of course

Lectures and training course

Lectures were delivered on Application of Remote sensing and GIS on salinity assessment, use of isotopes in salinity assessment; data requirement, soft computing, hydrogeology and salinity of Punjab, groundwater salinity and its remediation. A total of 13 lectures and 5 tutorials were given during the course and all were very well appreciated.

Feedback and valedictory function

The valedictory function was presided over by Chairman, PSFC and Er. B.S. Sidhu, Member Secretary. All the participants have appreciated the course work, presentations and all the lectures delivered (plates 5 and 6).

Plate. 5, Discussion on training course

Plate. 6, Feedback of training course

Feedback evaluation is as below:

- Overall view of the Training Course: Very useful **77%**
- Your impression about lectures delivered in the training course Very useful **77%**
- How do you find the arrangements for the training course? Excellent **86%**
- What do you feel about the duration of the course? Excellent **95%**

Overall, participants appreciated the course design and lectures delivered.

Details of the participants and time table is given in Annexure I and II, respectively

Annexure 1

List of participants for training course on "Groundwater issues of Punjab with special emphasis on groundwater salinity": July 16 - 18, 2019 Punjab Water Resources Department, Chandigarh

Sr. No.	Name	Email	Mobile	Designation	Address
1	Veenakshi Sharma	dirwqdwss@gmail.com	9815951211	Director	WQ unit, DWSS, Phase 2, SAS Nagar
2	R K Setia	setiark@gmail.com	9646105308	Senior Scientist	Punjab Remote Sensing Centre, PAU Campus, Ludhiana-141004
3	Pradeep Kumar Litoria	pklitoria.prsc@gmail.com	9815035745	Senior Scientist	Punjab Remote Sensing Centre, P.A.U. Campus, Ludhiana - 141004
4	Gurjot Kaur	eewaterquality@gmail.com	9868940091	Executive Engineer	WQ Unit, DWSS, Punjab
5	LAXMI NARAYAN GOEL	xenwrho@gmail.com	9814836435	Executive Engineer	Water Resources Bhawan, Sector 68 Mohali
6	SUKANT ABROL	abrol.sukant@rediffmail.com	9779952695	Senior Hydrogeologist	Water Resources Bhawan, Sector 68, Mohali
7	Jawala Parshad	jawala.parshad@gmail.com	7009712687	Geologist	Office of Assistant Geologist, Ground water cell, Deptt. Of Agriculture and farmer welfare, Kapurthala
8	ARVIND DEEPAK SABHARWAL	arvindsabharwal1976@gmail.com	9814323293	Assistant Geophysicist	628 Urban estate phase 2
9	Inderpreet Singh	indersingh09@gmail.com	9915682500	Assistant Engineer	Water Resources Bhawan, Sector-68, Mohali, Punjab
10	Manpreet Singh	karanpreet_2004@yahoo.co.in	9417111996	Assistant Hydrologist	kheti bhawan, Phase VI ,Mohali
11	Sandeep Singh Walia	sandeep317@gmail.com	9464121844	Assistant Hydrologist	Kheti Bhawan, Phase 6, Mohali
12	Jaspal Singh	agroparpb@gmail.com	9876076574	Assistant Hydrologist	Agriculture Department,Ropar
13	Kushal Bhalla	kushal.bhalla@gmail.com	8566805175	Research Officer	Farmers' Commission For The State Of Punjab Punjab Mandi Bhawan Building Sector 65-A, Phase XI, Mohali
14	Ishan Kaushal	ishan_kaushal@yahoo.com	9815212243	Sub Divisional Officer	Water Quality Unit, DWSS, Phase 2 Mohali

15	maheep negi	maheep@live.com	9653451534	Sub Divisional Officer	Water Resources Bhawan, sector 68
16	Jaswinder Singh Bedi	bedi1962@yahoo.com	9876618413	Sub Divisional Officer	Water Resources Bhawan Sector 68
17	Sandeep Kumar	SANDEEP8112@GMAIL.COM	8968090409	Sub Divisional Officer	Water Resources Bhawan Sector 68
18	Sahil Thakur	THAKURSAHIL681@GMAIL.COM	9814859894	Sub Divisional Officer	WATER RESOURCES BHAWAN, SECTOR 68, MOHALI
19	AKASH AGGARWAL	AKASH.AGGARWAL101@GMAIL.COM	7451901000	Sub Divisional Officer	WATER RESOURCES BHAWAN, SECTOR 68, MOHALI
20	PRATHAM GAMBHIR	GAMBHIR.PEC@GMAIL.COM	9888652218	Sub Divisional Officer	WATER RESOURCES BHAWAN, SECTOR 68, MOHALI
21	MANDEEP SINGH CHEEMA	MANDEEPSINGH1305@GMAIL.COM	9888809110	Sub Divisional Officer	WATER RESOURCES BHAWAN, SECTOR 68, MOHALI
22	Ashok kumar	ashokgwc@gmail.com	9888056066	Hydrogeologist	Department of Agriculture and Farmer Welfare (Punjab) Ground water cell Flat no 325, Ghalauri Gate Patiala (Punjab)
23	Rahul Jayprakash Sharma	rsharma16996@gmail.com	7020114513	Hydrogeologist Jr.	Punjab Remote Sensing Centre, P.A.U. Campus, Ludhiana - 141004
24	Raj Kumar Singh	punjabwrd@gmail.com	9855821322	Chemist	Water Resources Bhawan, Sector 68, Mohali
25	TANDEEP SINGH DHALIWAL	tandeep_singh@hotmail.com	9417871955	Technical Expert (GW)	Kheti Bhawan, Site no. 204, Phase-6, SAS Nagar Mohali, Punjab
26	Atul Kumar Sood	atulsood38w@yahoo.co.in	9779988133	Geophysicist	Water Resources Bhawan, Sector 68, SAS Nagar.
27	Randhir Singh			Hydrogeologist Jr.	Punjab Remote Sensing Centre, P.A.U. Campus, Ludhiana - 141004
28	Rajesh Vashisth	rvashisht_chd@yahoo.com	9872211377	Joint Director, Agriculture	Kheti Bhawan, Phase 6, Mohali
29	Vijayant Kumar Bhagi	VIJAYANT.BHAGI62@GMAIL.COM	9878960044	Senior Hydrogeologist	WATER RESOURCES BHAWAN, SECTOR 68,

					MOHALI
30	Neeraj Pandit	neeraj468@yahoo.com	9417019856	Geologist	kheti Bhawan, Phase VI, Mohali
31	Varun Garg	varun.garg.juit636@gmail.com	8968885000	Sub Divisional Officer	Water Resources bhawan Sector 68
32	RAMANDEEP SINGH SEKHON	ramansekhon001@gmail.com	9781170003	Assistant Hydrologist	Office of Assistant Geologist ,Ground water cell , Malwal Farm ,Ferozpur ,Pb ,IND
33	Jaspal Singh	jaswantsingh731@gmail.com	8725827072	Geologist	Kheti bhawan, phase 6, SAS Nagar
34	Deepak Sethi	deepaksethi2005@gmail.com	9463906817	Geologist	Kheti bhawan, phase 6, SAS Nagar
35	CSP OJHA	cspojha@gmail.com	9897604320	Professor	IIT Roorkee

Annexure 2

Training Schedule
Groundwater issues of Punjab with special emphasis on groundwater salinity:
July 16 - 18, 2019
Punjab Water Resources Department, Chandigarh (Venue: Forest Complex, Mohali)

Time	16/07/2019	17/07/2019	18/07/2019
	Tuesday	**Wednesday**	**Thursday**
9.00-9.20 A.M	Registration	Groundwater salinity (**GK-1**)	Uses of environmental tracer in field investigations: examples from Punjab studies (**GK-3**)
9.20-10.00	Inaugural & Introduction		
10.00-11.00 A.M	Challenges and issues of depleting groundwater and agricultural scenario in Punjab state (**RV**)	Hydrogeology and salinity issues in Punjab (**AN**)	Groundwater data requirement and analysis (**CPK-2**)
11.00-11.15 A.M			
11.15 A.M-12.15 P.M	Application of RS & GIS in salinity assessment (**SKJ-1**)	Groundwater recharge potential in Punjab (**SKS**)	GW level fluctuations: A Case Study of Punjab (**GK-4**)
12.15-1.15 P.M	Demonstration/Tutorial -1 (**SKJ-2/AKL**)	Emerging water insecurity in Punjab (**RSG**)	GW measurement techniques and data analysis – practical demo (**G**K) –T4
1.15.-2.15 P.M.			
2.15 P.M-3.15 P.M	Concepts of Groundwater hydrology: (**SK-1**)	Assessment of groundwater potential (**CPK-1**)	Groundwater balance – T5 (**CPK**)
3.15 P.M-4.15 P.M	Hydrological data processing and soft computing techniques in GW studies (**AKL-1**)	Measures of salinity remediation (**GK-2**)	Discussions on GW issues: water level depletion, water quality deterioration, salinity and water logging: CPK, GK, RV, KST, CSPO
4.15 P.M-4.30 P.M			
4.30 P.M-5.30 P.M	Aquifer parameter estimation-Tutorial (**SK**) –T2	Salinity experiment demonstration-(**GK-3**)-T3	Feedback & Valedictory

CPK-Er. C.P. Kumar; **RV**; Sh. Rajesh Vasishth; **SKJ:** Dr. Sanjay Kumar Jain**; AKL**-Dr. A.K. Lohani; **SK**- Dr. Sumant Kumar; **GK**-Dr. Gopal Krishan; **AN**: Sh. Anoop Nagar, CGWB; **SKS**: Sh. SK Sehgal, CGWB; **RSG**; Dr. R S Ghumman; CRRID; **KST**-KS Takshi; CSPO-Prof. CSP OJHA