



# WATER TALKS

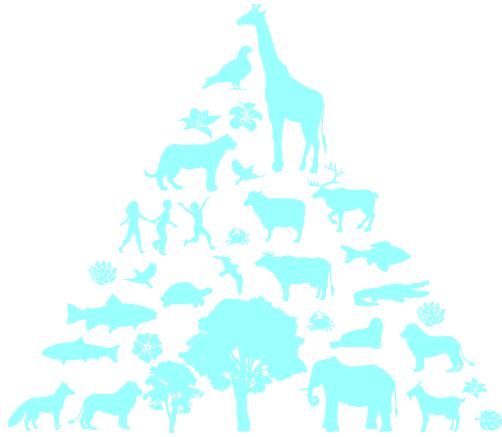
2019-20 SERIES - THE ESSENCE



NATIONAL WATER MISSION

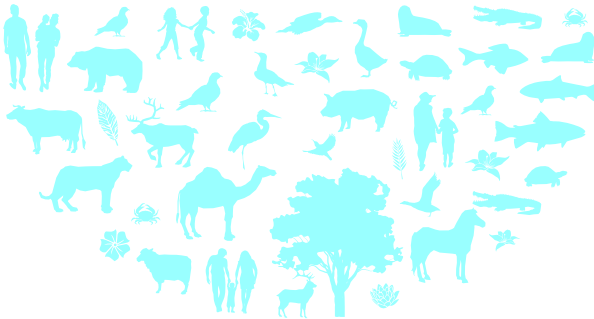
हर एक काम देश के नाम





# WATER TALKS

2019-20 SERIES - THE ESSENCE



**Water Talks**  
**2019-20 Series. The Essence**

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We Thank

Shri. Gajendra Singh Shekhawat  
Hon'ble Minister for Jal Sakthi,  
Government of India

and

Shri. Rattan Lal Kataria  
Hon'ble Minister of State for Jal Sakthi,  
Social Justice and Empowerment,  
Government of India

for their support and guidance





## Introduction

Water Talk Series, an initiative of the National Water Mission (NWM), was started on 22nd March, 2019, the World Water Day at the behest of Shri. U.P. Singh, Secretary, the then Ministry of Water Resources, River Development and Ganga Rejuvenation. National Water Mission has been holding this event, every month without break, since then. Lectures on water related issues were delivered by eminent academicians, bureaucrats, activists and practitioners in these “Water Talks”, held (mostly) on the third Friday of the month.

This book attempts to capture the essence of each "Water Talk" delivered.





## A boond of gratitude

Water is indispensable to almost all domestic and economic activities, including agriculture, energy production, industry and mining. With impacts on health, gender equity and livelihood, water management is crucial to sustainable economic development and alleviation of poverty. With the advent of climate change, both quantity and quality of water resources are being affected. This may affect the way in which water is available for utilisation across the different sectors reinforcing the need for adequate responses to mitigate the effects of climate change on water resources.

In a bid to draw attention to critical aspects of water and promote dialogue to promote innovations that offer solutions, the National Water Mission launched its 'Water Talk' series. The Water Talk program is a platform wherein water experts, bureaucrats, academicians and activists to share their views and critically analyze the prevalent water-related issues and offer solutions to combat these issues. The idea is to stimulate awareness, encourage people to actively participate in saving water and inspire others in doing so.

In the first week of March, 2019, a few weeks after my taking over as MD, NWM, a stray remark in a meeting by Shri. U.P.Singh, Secretary, MoWR, RD and GR that he would like have a discussion forum on water issues triggered me on the process to start the Water Talk series. When told on 6th March, 2019 to the 5 member National Water Mission team that we will start the Water Talk series on 22nd March, 2019, the World Water day, it was met with disbelief. They felt that it would be difficult to get going in such a short period. But I persisted. So, when on

the 22nd of March, 2019 the Water Talk Series was launched by Shri. U.P. Singh, Secretary at the Dr. Ambedkar International Center, New Delhi in the presence of 750 participants, it was an achievement of sorts. The innovative Kalash Pujan, the Water pledge and the exhibition of Water-theme cartoons drawn by international cartoonists added to its flavor. The four eminent speakers set the stage for the next 11 “Water Talks” in the Eleven ensuing months, every third Friday of the month, without any breaks, from 3 PM to 5 PM, (mostly) at the same venue.

Water-Talks were delivered by Water experts, academicians, engineers, activists, practitioners; - all drenched in a shared passion-their motivation and demonstrated dedication on water related issues. It is a matter of pride that two of our “talkers” were honored with Padma awards in this year itself - Shri. Anil Joshi was awarded the Padma Bhushan and Shri. Popat Rao Pawar, the Padma Shri.

NWM thanks - All the speakers who delivered high quality Water-Talks; Shri. U.P.Singh, Secretary, DoWR, RD & GR, Ministry of Jal Sakthi for his inspiration and guidance; JS&FA and finance wing of MJS for their support; participants from the Ministry of Jal Sakthi and its subordinate offices like CWC, GWB, NMCG etc and the water enthusiasts who attended the Water Talks regularly.

We have continued the Water Talks for the last 12 months without a break. Hope to continue it so in future also, with active co-operation of all water-warriors and water- aficionados like you!

New Delhi  
10th March, 2020

-G. Asok Kumar  
Additional Secretary and Mission Director  
National Water Mission,  
Ministry of Jal Sakthi,  
Government of India



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# The 'Water Talk' Series

As the name itself suggests, 'Water Talk' is an initiative that aims at promoting dialogue and discourse around the different areas of water. National Water Mission (NWM) initiated this lecture series with an objective of information sharing among people on a variety of water related topics. 'Water Talk', the lecture series, runs on the third Friday of every month wherein leading Water experts are invited to present inspiring and broadening perspectives on current water issues in the country.

The aim of 'Water Talk' is to stimulate awareness, (thinking), build capacities of stakeholders and encourage people to become active participants sustain life by saving water on earth. It was launched with the belief that sharing of ideas among people will enhance knowledge, ensure consistent dissemination of information and build capacities in better water management. The programme also acts as an intellectual platform to transfer knowledge, solve problems, brainstorm and promote teamwork among the participants of the talk. Since it is intended to serve as a gateway of knowledge, best practices and experiences leading to cross learning of new developments, the speakers invited are scientists, academicians, engineers, scientists and activists or dedicated practitioners in the field of water. The 'Water Talk' provides a space to these water experts to share their views and critically analyse the prevalent water-related issues in practice and highlight the importance of water conservation in the contemporary Indian situation.

NWM has consistently organized Twelve Water Talks with distinguished speakers in this series so far. All speakers have been from different walks of life and have presented a variety of perspectives and practical knowledge in their area of expertise. This has given an opportunity to learn and replicate the best water conservation and management practices in the country.

# Launch of the Water Talk Series



The Water Talk lecture series was inaugurated by Shri. U.P Singh, Secretary, of the then Ministry of Water Resources, River Development and Ganga Rejuvenation, (MoWR, RD & GR) on 22nd March, 2019, the World Water Day.

Water is one of the “Panch Bhoota”-the five basic elements of nature. Life in this planet originated in water. Life in this planet is sustained by water. Thus, water has a unique relationship with humankind with physical, social, economical, ecological and spiritual values attached to it. To invoke those values, “Water Kalash Pujan” ceremony was carried out after the welcome address.

After the Water Kalash Pujan ceremony, the following pledge to conserve water was administered to all participants by the Secretary:

## Our Water Pledge

“I take an oath to conserve water and to use water wisely.

I pledge to consume water judiciously and not waste even a drop of water.

I will treat water as a most precious treasure that  
I possess and consume it accordingly.

I pledge to motivate my family, friends, and  
neighbours to use water wisely and not waste it.

It is our planet. Only we can save it  
and thus save our future!!”

Setting the stage of the Water Talk series, Shri. U.P Singh emphasised the need to have a common platform wherein all water related ministries and organisations interact and collectively churn out solutions related to water. He said, “Even in water ministry, departments seem to work in silos and there is little interaction between Central Groundwater Board (CGWB), Central Water Commission (CWC), National Mission on Clean Ganga (NMCG), National Water Mission (NWM) etc. The idea to launch Water Talk Series is to exchange ideas and to gain knowledge of different aspects of water.” He called for a paradigm shift from supply side management to demand side management including environmental concerns related to water and mentioned about the need to generate awareness among citizens, revise policy framework and encourage collective participation to combat water crisis in the country.

Shri. G. Asok Kumar, Mission Director, National Water Mission, in his welcome address also elaborated on the concept of “Water Talk” initiative and sought ideas, opinions and cooperation from participants to make it a successful event.

An exhibition of cartoons on water-related theme made by Indian and International cartoonists and demonstration of water saving equipments like aerators was also organised alongside the event.



# Essence of the inaugural talk by Shri. U.P.Singh on March 22, 2019, Secretary, MoWR, RD&GR

रहिमन पानी राखिये, बिन पानी सब सून ।  
पानी गये न ऊबरे, मोती मानुष चून ॥

- Water and water related issues have assumed great significance recently and people are becoming aware of the critical situation of water. It is therefore, important to find sustainable solutions and implement them with their active participation.
- Several departments and ministries in Government of India are dealing with issues related to water and they all work in tight silos most of the time. It is of prime importance for the officials of these ministries to understand different dimensions and aspects of water. 'Water Talk' is an attempt to involve every citizen including government officials in the dialogue over water. This platform gives eminent water experts and practitioners across the country to come and share innovative practices that can provide an opportunity to replicate and spread good practices in water sector.

## Climate Change & Rainfall:

- India receives around 1000 mm of rainfall annually, although unevenly distributed temporally and spatially.

With the changing trends in climate change, the rainfall pattern has also changed over the years. The same amount of rainwater (say 200mm) that poured over a span of 20 days now pours within 2-3 days. The existing streams and ponds aren't designed to hold such volume of water coming at such short interval, causing floods in many parts of the country. There is therefore a need to become climate resilient to combat climate change and create storage spaces to conserve this water.

## Need for sustainable water resource management system

- There is now an emphasis on sustainable management of resources

alongside development. Sustainable water resource management must include the management of both surface water and groundwater. Although there is much stress on replenishing surface water, recharging of groundwater is equally important. Water that is consumed must be replenished and the problem lies in the fact that adequate measures aren't being taken towards replenishment of water.

Supply side management:

Wetland conservation and rejuvenation of rivers & springs-

- Water recharge can be both natural and artificial. There are plenty of lakes and rivers in almost all cities of the country. Need is, therefore, to take measures to increase the volume of water and take active flood control measures.
- A river is the one there is flow of water. Many rivers in India, like Yamuna in New Delhi, do not have adequate flow of water for many months of a year. They have either no water or stagnant sewage water during lean periods. A minimum ecological flow of water in all the rivers is to be ensured by appropriate interventions.
- Spring Rejuvenation is another significant aspect as most rivers originate from springs and glaciers. Ganga originates from Gaumukh/ Gangotri glacier. Bhagirathi stream and Alaknanda stream meet at Devprayag to form the Ganga river. 60% of water in Bhagirathi comes from springs. Many of these springs are drying up and most perennial springs are now turning seasonal. So when we try to conserve and clean River Ganga, we also need to take steps to protect its sources. Similar is the case with most of the other rivers in the country.

Conservation of Traditional Water Bodies and Rainwater Harvesting

- There are many traditional water conservation structures like step-wells, Bavlis and tankas in our country. Most of them have in poor state of maintenance. These are to be revived and put to use.
- In the 1980s, Tamil Nadu government had taken steps to make roof

top rainwater harvesting structures mandatory in every building. Similar steps can be taken in all states.

- There are many small water bodies in the villages of the country. They need to be identified and rejuvenated.
- Rainwater use efficiency: It is crucial to use rainwater, where it falls. It's important to focus on not just land productivity but also on water productivity.
- There needs to be a paradigm shift in approaching the problem by moving beyond construction of water holding structures, dams and canals.
- There is a need to encourage peoples' participation by generating awareness.

Demand Side management-

- There has been enough focus on managing the supply side of water resources. There is now a pressing need for us to cut down on our water requirements and increase water use efficiency. According to data, India's water use efficiency stands at 38%, implying our water consumption is more than 2.5% times of what it should be.

Agriculture & over-exploitation of water resources- Agriculture is the biggest consumer of water at 85%. With farmer-friendly policies like free power and no charge for water etc of most governments, farmers enjoy unlimited free access to water and electricity. This has led to uncontrolled exploitation of ground water. Along with these, skewed procurement policy system in the country have motivated large number of farmers in Punjab and Haryana to grow wheat and paddy which are water intensive or high water tolerant crops . This has caused these states to exploit almost all its groundwater resources, pushing most of its blocks into the alarming exploited zones.

Industries and Waste water -

- In India, Industries use less than 10% of available water.
- Most of untreated waste water is made to flow into water bodies such as rivers and lakes and pollute them.

- There is a high scope for adopting efficiency measures like “Zero liquid discharge”. One such good practice was adopted by paper mills industries under the supervision of the Central Pollution Control Board that reduced the use of water per ton by 50%. The reduction of consumption in water by 50% also implies that the waste water generated comes down by 50%.
- Many of the STPs and waste water treatment plants constructed in the country are functioning much below its designed capacity. Many of them are, in fact, not fully operational and their discharge do not meet approved norms and standards.
- To address these issues, National Mission for Clean Ganga is trying out the Hybrid Annuity Model of PPP in the big STPs being constructed in big cities of the Ganga basin. Under the HAM model, the concessionaire or contractor will only be paid 40% until commissioning and the balance 60% of Capex along with interest would be paid over a period of 15 years. They have to operate the plant as per the approved discharge conditions for 15 years for which Opex will be paid by NMCG through the state governments.

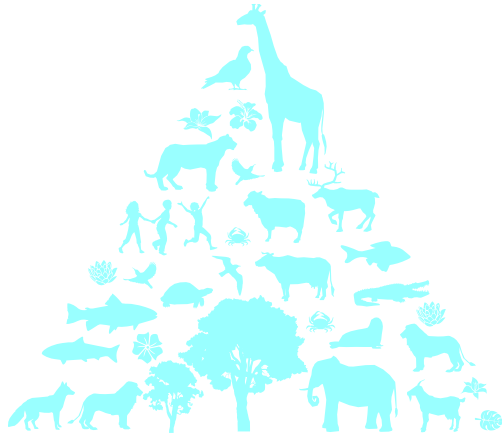
#### Concept of Water Footprint:

Every stakeholder must be educated about the concept of ‘Water footprint.’ It is the amount of water used in the production of goods. When goods are exported, water used for its production also gets exported from the area!

eg: Rice in India has a water footprint of 3000Lts/Kg. So for every kilo of rice sent out from an area, 3000L of water also is sent out! States like Punjab and Haryana export a large quantity of rice and wheat to other states. No wonder that most of their Blocks are Water-stressed. India has the largest irrigated area in the world, mostly for rice and wheat, causing 70% of groundwater depletion

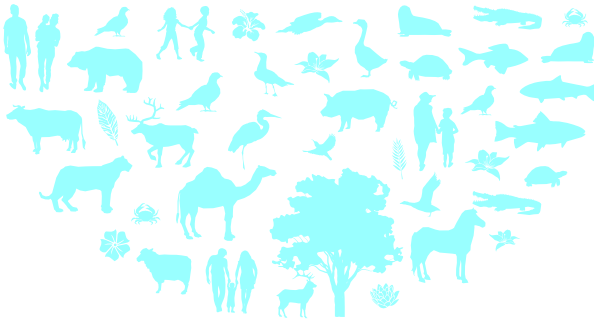
Water is a precious finite resource. Hence, there is the need for Integrated Water Resource Management , which addresses all issues related to water holistically.





# WATER TALKS

2019-20 SERIES - THE ESSENCE



Water Talk	Name of the Speaker	Theme of the Talk	Date
Water Talk 1	Shri. Pushpendra Singh	Water conservation in Bundelkhand Aapna Talaab Abhiyan	22.03.2019
	Shri. Manu Bhatnagar	Urban water supply and management	
	Shri. Sachin Oza	Ground water management and integrated water resource management in the command area of irrigation systems of northern water stressed areas	
	Shri. Alok Sikka	Agricultural water management	
Water Talk 2	Shri. Shashi Shekhar	Ground Water Governance-prospective, challenges and suggested interventions	01.05.2019
Water Talk 3	Dr. Nayan Sharma	Upgrading Technology in Irrigation, Hydro Power, Navigation and Flood Control for Optimal Water Conservation	24.05.2019
	Shri. Pradeep Gandhi	Water Conservation at Ground Level	
Water Talk 4	Dr. Anil Joshi	Ecology Inclusive Economy	21.06.2019

Water Talk	Name of the Speaker	Theme of the Talk	Date
Water Talk 5	Dr. Tushaar Shah	Governing India's Energy- Groundwater Nexus: Old Constraints and New Opportunities	19.07.2019
Water Talk 6	Shri. Popatrao Pawar  Shri. Umakant Umrao	Hiware Bazar – A Water Budgeting model  The Dewas Initiative: An economically viable & environmentally sustainable Water Conservation Model 'Beyond Rivers'	23.08.2019
Water Talk 7	Shri. Sonam Wangchuck	Water Conservation and construction of artificial Glacier known as Ice-Stupa in Leh-Laddakh Region	20.09.2019
Water Talk 8	Shri. Heera Lal	Water Conservation in Banda District, UP	18.10.2019
Water Talk 9	Dr. Himanshu Kulkarni	Groundwater Management and Governance in India	15.11.2019
Water Talk 10	Dr. Mihir Shah	A New Water Strategy for India	20.12.2019
Water Talk 11	Shri. Balbir Singh Seechewal	Seechewal Model of Water Rejuvenation	17.01.2020
Water Talk 12	Shri. Ayyappa Masagi	Water Crisis Management	21.02.2020

# Water Talk-1

Speaker-1

Shri. Pushpendra Bhai



Pushpendra Bhai is a farmer from Bundelkhand region in Uttar Pradesh. He was successful in encouraging and motivating farmers in the Bundelkhand region to dig ponds in part of their own fields to conserve rain water to address the issue of water scarcity. His 'Apna Talab Abhiyan' campaign was started during Drought Year 2013 in district Mahoba to sensitize and encourage around 50000 farmers to take up Rain Water Conservation, Pond Construction and Community Pond Conservation.

He has been working towards making farming more progressive and scientific. For the past many years, Pushpendra Bhai has been trying to connect the Indian farming system with modern techniques and orient farmers towards developing agriculture through a rotating farming system.



# Essence of the talk delivered by Shri. Pushpendra Bhai

- ◆ Recurrence of frequent drought in Bundelkhand region of UP and MP, motivated Shri. Pushpendra Bhai, a farmer from the area, to work towards saving and conservation of water. He took it upon himself to inspire other farmers like him to rejuvenate groundwater by building ponds.
- ◆ According to him, using simple innovative techniques to motivate them, he prevailed upon them to create 12,149 talabs (ponds) creating 5,37,48,300 cubic meters of water holding capacity to provide water for one time irrigation of 60,000 Ha of hitherto un-irrigated land and two time irrigation for 30,000 Ha of land.
- ◆ According to studies, in the region 80% of groundwater is used for agricultural purposes, making farmers the largest consumers of water. Hence it was their moral responsibility to rejuvenate groundwater.
- ◆ Much of the burden for procuring drinking water was on women and small children and hence it was much more necessary to take up water conservation work.
- ◆ So he embarked on a mission- “Apna Talab Abhiyan”- to build ponds wherever possible with the partnership of local villagers and to ensure long term ownership among them towards the assets created. The idea was to make water saving a subject of society.
- ◆ The pond rejuvenation campaign led by him broadly covered the following initiatives :
  1. Paani Punurusthan Pehel
  2. Infrastructure Development & Rainwater Harvesting.
  3. Apna Talab Abhiyan.
  4. Farm Designing
- ◆ **Paani Punurusthan Pehel**- At that time, there was no major government scheme dedicated to pond building scheme so the

farmers community themselves started working towards rejuvenation of ponds by offering “Shramdaan.” Gradually, a more organised strategy was formed after the government noticed the efforts of the farming community and supported the initiative.

- ◆ **Rainwater Water Harvesting Model-** During the construction project of one of the major railway line in the district, sand/earth was being taken from farmers by the construction agency. Smelling an opportunity, Shri. Pushpendra Bhai convinced those farmers to dig the earth/sand from a place that had capacity to hold and retain the rainwater. The pond construction procedure was explained clearly along with the rough estimates of the quantity of sand to be dug out and the capacity of water, the pond thus dug can hold. This way more and more farmers came forward for pond construction and could store water when it rained. They became water sufficient and benefited from this initiative. As more number of farmers got involved in the campaign, district administration also supported the initiative.
- ◆ **Apna Talab Abhiyan-** This campaign was started with the help of the district collector of Mahoba district. Farmers constructed around 1100 farm ponds in which about 20 lakhs cubic meter of water was stored. Aapna Talaab Abhiyan, is a unique oligarchy of its kind. In this yojna, everyone has the freedom of time, including their share of possible sacrifices. The main feature was the “Shramdan” which was given by the local people for construction of ponds.

Large gatherings and meetings were arranged across Bundelkhand, UP to sensitize and encourage around 50000 farmers to take up Rain Water Conservation in individual and community ponds. Appealing to the farmers’ basic instincts like the craving for respect among peer group, he could motivate them to dig ponds in their fields. Farmers who initially came forward to dig ponds in their fields were touted as “brand ambassadors” of the campaign. He would get them to meet the DM and get a certificate of “Jal Adhikari” from the “Jilla Adhikari”. These certificates from the DM

were honored by government offices in the district and gave its holders a sense of enhanced respect. This was an added motivation to farmers to take up pond construction in parts of their fields.

People began to appreciate the benefits of ponds. It is worth mentioning that now in some areas of Dewas, about 80% of people have their own private ponds. Many dried up wells in the field of many farmers in Mahoba and Banda districts have been recharged by these Apna Talabs. Large areas of dry lands have become cultivable. Apna Talabs have proved capacity to sustain crops during drought years. These ponds have resulted in increased water table in ground and increased humidity in atmosphere, reduced exploitation of ground water, and better soil moisture - all these leading to better productivity for farmers.

- ◆ **Farm Designing-** is a concept to enhance the “respectability of farming” and attract youngsters to farming which is the need of the hour. This can also in turn address the unemployment issues in the country. Sustainable agriculture is possible if farm designing is adopted. One third of the land can be earmarked for pond, one third for fodder for cattle and the remaining one third for agriculture. But with the good water available from the pond nearby and organic manure from cattle, productivity and income for farmers will be substantially increased, effectively offsetting the reduction in the area of cultivation.
- ◆ Inspired from encouraging results Uttar Pradesh launched “Khet Talab Yojna” under which about 9549 Tanks were constructed with a capacity of 2,13,83000 Cubic meter during the year 2016-2019.



# Water Talk-1

## Speaker-2

### Shri. Manu Bhatnagar



Shri. Manu Bhatnagar is the Principal Advisor, Natural Heritage Division at INTACH and has done his Masters in Regional Planning from Cornell University, USA. He has expertise in urban planning, urban biodiversity, environment planning, regional landscapes, drawing up lake conservation/ management plans, crafting urban water policy, unconventional wastewater treatment. He is given the role of team Leader for Smart Cities Project for Allahabad and Aligarh cities. His work spans over India, Thailand, Sri Lanka, Nepal and the United States of America. He is also a visiting faculty member and a thesis guide at School of Planning and Architecture, New Delhi. He is a member of the Indian Council of Architecture, Associate Member of Institute of Town Planners, India and Life Member, Indian Association of Aquatic Biologists. He has also published papers in areas like Planning for a Sustainable Resource Base, urban development and natural heritage, among other areas.





# Essence of the Talk Delivered

## by Shri. Manu Bhatnagar

- ◆ In 2018 during summers, a town in South Africa had exhausted all available water resources and was forced to transport water from different parts of the country. Recently, the water situation in Shimla became so bad that tourists were asked not to visit the town with locals not having adequate water to even bathe daily. The Niti Aayog also came up with a Composite Water Index which measured the performance of various states on the basis of certain parameters. It was noted that Meghalaya, despite receiving a rainfall of 4mm annually was the worst performing in the list. Recent cases of water shortages in Shimla, Delhi and Meghalaya presents an opportunity to learn about the diverse nature of water issues and the integrated solutions needed to grapple this growing problem.
- ◆ The government recently came up with a housing scheme project for Kidwai Nagar in Delhi which was halted after being challenged in the court. The point of conflict being the availability of water for the project. Similarly, a masterplan for Delhi (2041) was being prepared and the only concern of the authorities was the availability of water resources to support the development plan, leading to the big question, “where would the water come from?” Delhi is a largely urbanized city-state with a huge and growing concentration of population which requires to be serviced with water supply and sewage treatment facilities. The problem is compounded with fragmented responsibility over water supply, collection of sewerage, river water & groundwater management, water body conservation, water harvesting, making it difficult to take a fully coordinated approach on water issues.
- ◆ Rejuvenation of Hauz Khas Lake- Out of the 1000 lakes that once existed in Delhi, only 450 have been located that too in a critical condition. The popular Hauz Khas lake, an old 16 acre water body, located in the DDA park in Hauz Khas, had once completely dried

up. In 1998, efforts were made by the organisation to rejuvenate the lake and an appeal was made to the Delhi government for the same. It was noted that the water body was unable to collect any rainwater due to its porous bed.

- ◆ On further investigation, a sewage plant was located at Vasant Kunj which dealt with second level water treatment. The outflow was traced through a rain sewage line, flowing through, “Sanjay Van”, a reserve forest area, diverting through Ring Road and eventually joining river Yamuna. This was seen as a great method of using the recycled water to revive the lake.
- ◆ Recycling of Sewage Water- To carry this out, check dams were constructed in Sanjay Van to treat secondary level water in an efficient manner. For the sake of treatment, the plants present behind the check dam to remove organic pollutants, making the water even cleaner. This water led through an open place channel where other channels untreated water met. In order to isolate the treated water, pipes were used that separate it from the untreated sewage water and make it reach the Hauz Khas lake. The success of the project assures recharge of groundwater 365 days a year with the city receiving 5-7 good rainfalls in a year. The lake is now home to numerous migratory birds from Central Asia. The amount of water collected through this project alone in the past 13-14 years is greater than what has been achieved putting numerous other projects together.
- ◆ The recycled water has been tested for its quality and proved to be safe for potability after chlorination. Infact, the nearby localities use the treated groundwater for domestic purposes without posing complaints. It’s a pioneer project of recycled water that can be used as a revival mechanism for urban lakes.
- ◆ Forest Cover & Rainfall - According to a land dune study conducted by INTACH, it was found that only 2% of forest cover is left. While the annual rainfall received between 1950-2000 was 880mm, it was reduced to 750mm between 2000-2010, and further fell to 650mm between 2012-16, reason being decrease in forest cover. Forest

covers form an important aspect of water infrastructure. Forests are concentrated in some parts of the country and if not dispersed, rainfall will not be dispersed.

- ◆ Agriculture & Rainfall- In Khajuraho area of Bundelkhand, rainfed agriculture is being practiced with no major perennial river falling under the area. Initiatives were taken to promote no-till farming, crop rotation, organic inputs, and reduce chemical inputs as fertilisers and pesticides require more water for dissolving and also deteriorate the soil quality. An improved soil structure and porosity was observed in Khajuraho. The practice of no-tilling has made the soil more compact with the use of machines, disallowing the water to flow in a downward direction.



# Water Talk-1

## Speaker-3

### Shri. Sachin Oza



Shri. Sachin Oza, Administrative Director, Development Support Center (DSC) Foundation works for resolving conflict between improved rural livelihoods and sustainable ground water management through research, policy and capacity building. A social worker by profession, he has 23 years of experience in the voluntary sector. He trains on subjects such as people's participation and institutional development. He represents the organization in several policy making forums at the state and national level. Shri. Oza is also involved in DSC foundation`s activities as research dvisor and lead trainer.



# Essence of the talk delivered by Shri. Sachin Oza

- ◆ Development Support Center (DSC) is a resource organization that provides knowledge-based support to Non-Government Organizations (NGOs), Corporate Houses (CSRs), Government Agencies, Community Based Organizations and other stakeholders in the field of Participatory Natural Resource Management (PNRM) and sustainable livelihoods. DSC provides a variety of services through multi-disciplinary team of professionals that directly implements projects, helps in capacity building of key functionaries, carries out field studies and takes initiatives for research and appropriate policy changes. DSC has recently been secured an award in the category of Water Education.
- ◆ Water stressed regions of Dharoi, Mazum and Guhai in northern Gujarat have some interesting cases of sustainable groundwater management and integrated water resource management in the command area of irrigation systems. Despite the presence of dams and several minor and major irrigation schemes, there is a water crisis in these areas.
- ◆ In many agricultural plains of Gujarat, there was an assured irrigation system in place, yet people were suffering due to the lack of an integrated approach in irrigation. It was observed that canal irrigation decreased by 40% and groundwater irrigation through borewells increased by 53% in the water stressed regions. Farmers were moving from wheat and cotton cultivation to growing castor as it is a sturdy crop.
- ◆ To combat the issues faced by farmers, some initiatives were introduced at the grassroot level.
  1. Demand side management approach
  2. Introduction of varieties of wheat crop
  3. Mulching, a practice of reducing evaporation to suppress weed

growth by covering the topsoil surface with organic materials like straw, grass, stones etc.

#### 4. Addition of organic inputs.

- ◆ With support of Hindustan Unilever Foundation, DSC started a programme that focused on awareness creation, community mobilisation and execution of work. Integrated Water Resource Management (IWRM) is essentially a concept that looks at the supply and demand side of water in a holistic and sustainable manner. Under this programme, 150 water harvesting structures were built.
- ◆ Community workers called “Bhujal Jaankars” were made responsible for groundwater monitoring. The “Bhujal Jaankars” carried out monitoring of about 700 wells in 24 villages for preparing and sharing the data on groundwater behavior with the Sujal Samitis (WUAs) for awareness and capacity building purpose.
- ◆ People were also trained about effective farming practices that used less water. Farmers were educated about System of Wheat Intensification, water budgeting & crop water planning exercises to reduce water footprint.
- ◆ In the past 3-4 years, about 23-million- cubic meter water was conserved through water harvesting treatments as well as through adoption of on-farm water management practices and 21-million-cubic meter water could be stored in harvesting structures. Over 1500 hectare of additional area was added and 8418 hectares of area was added to food production. To top it all, 1800 farmers adapted to low water footprint practices.
- ◆ DSC is also involved in implementation of various programs covering more than 653 villages in 17 districts having rain-fed and irrigated areas of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan. The organization has facilitated Water User Associations (WUAs), branch and project level federations in about 300 villages.
- ◆ To allay the growing menace of water shortage in the country, 8

steps were then taken by the organization on demand side management and simultaneously replenishing the water sources in order to have assured irrigation.

- ◆ DSC implemented the "Integrated Watershed Management Program" (IWMP) in collaboration with Government of MP, Climate proofing of watershed project with NABARD and "Integrated Water Resource Management" (IWRM) program with HUF in Gujarat and Bajaj Water Conservation project in Auranagabad, Maharashtra.
- ◆ Through these multifarious initiatives, local Water Users Groups have been encouraged towards monitoring their ground water resources and preparing water balance and water security plans - thus making the move possible from water stressed areas to water secured areas.



# Water Talk-1

## Speaker-4 Shri. Alok Sikka



Dr Alok K. Sikka is the International Water Management Institute (IWMI) Representative in India, since April, 2016. Prior to joining IWMI, he served as Deputy Director General (Natural Resource Management), Indian Council of Agricultural Research (ICAR) and Technical Expert (Watershed Development), National Rainfed Area Authority (NRAA), Planning Commission, Government of India, New Delhi.

He is Ph. D. in Civil and Environmental Engineering with specialization in Hydrology and Water Resources Engineering from Utah State University, Logan, Utah. Besides working with ICAR for many years at Central Soil & Water Conservation Research & Training Institute, Dehradun and its Research Centres, he was with National Institute of Hydrology, Roorkee; visiting Professor at University of Arizona, Tucson; and Oregon State University, Corvallis, USA. He has more than 250 publications and is recipient of many national awards including Fellow of National Academy of Agricultural Sciences.



# Essence of the Talk Delivered

## by Shri. Alok Sikka

- ◆ There is reduced public investment in surface irrigation. But expanded groundwater boom is leading to GW depletion and increased energy demand.
- ◆ Low Irrigation Efficiency ( $\approx 38\%$  in MMI Projects) and 65-70% in ground water
- ◆ Attributed to inefficient management of irrigation systems
- ◆ To achieve SDG 6 goals and to ensure water security, need to focus on water conservation and enhancing efficiencies through Integrated Water Management. There is a need for an integrated approach that encourages coordinated development of land, water and related resources and includes systematic interventions cutting across the dimensions of policy, technology, agronomy and resource conservation.
- ◆ **Integrated Water & Land Management Solutions include:** Enhancing storages (in situ, surface and groundwater); Improved conveyance & operation ; enhanced access to water; minimizing green and blue water losses in favour of transpiration; demand management-efficient water use, supplemental irrigation; conjunctive use of water and poor quality / wastewater; exploiting interaction of genotype and agronomic management; crop diversification; multiple water uses and integrated farming systems; improving water productivity; using policy, governance and institutional interventions.
- ◆ **Focus on Participatory Water Management:** It includes the premises of both surface Water and Groundwater management. It should be made mandatory to involve Water Use Associations( WUA) in water management.
- ◆ **Interventions in Agriculture**
  - Specific measures such as micro-irrigation, canal management

system, decision support system (ICT technologies and models) and participatory approaches towards irrigation water management can systematically introduce sustainable irrigation systems and optimize farmers' pecuniary returns.

- Some steps taken in the direction of water use efficiency in agriculture include:

Soil Management, Laser Land levelling, AWD- Alternate wetting & drying, Zero Tillage, use of direct Seeder, Aerobic rice planting, Raised beds for rice-wheat systems, Hydrogel-technology, Channel to field irrigation

- ◆ **Improvement in Irrigation Water Management can be achieved by:** Improving conveyance and distribution system of irrigation network; Canal supply & demand management through automation, bringing pressurized irrigation/ micro-irrigation as adjunct with canals; the use of space technology and ICT in precision irrigation management; Smart Irrigation - Wetting Front Detectors, Chameleon Sensors, Smart Scheduling-Tensiometer; dialogic tools (based on DSS) for linkage of canal operation and on-farm water management, Innovative institutions/ways of managing water through PPP, service providers, farmers' company, or federating WUAs into a Private Company; improved on-farm water management including structures; Laser land leveling, zero-tillage & resource conservation technologies, using modern irrigation methods (drip & sprinklers) and conjunctive use of good and poor quality GW / wastewater. Fertigation increases nutrient use efficiency by 40%.

- ◆ **Opportunities to increase Water productivity**

- Increase yield per unit of water consumed
- By improving water management to reduce stress at critical crop growth stages
- Improving non-water inputs that increase production per unit of water consumed
- Changing to new or different crop varieties with higher yield per unit of water consumed.

- Reduce non-beneficial depletion
- Increasing the proportion of water applied that is used beneficially by crops and restricting evaporation from bare soil and from fallow land
- reducing water flows to sinks (deep percolation and surface runoff) and minimizing salinization (or pollution) of recoverable return flows
- Tap uncommitted flows
- Adding water storage facilities, improving management of existing; and reusing uncommitted return flows
- Reallocate and co-manage water among user
- Reallocating water from lower- to higher value uses within or between sectors, while addressing possible effects on downstream uses
- Co-manage water through multiple uses of water

#### ◆ **Climate Resilient Initiatives:**

With the advent of climate change, there is a need to revisit the design of water management procedures. To combat the issue, IWMI has been working on climate resilience and climate smart agricultural initiatives including land and water management. The first ever solar pump irrigation cooperative is established in Gujarat, based on research done by the IWMI, WLE and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), with support from the Tata Trust.

#### ◆ **Water Conservation & Incentivisation:**

Incentivisation is the need of the hour. People can only be encouraged to save water if they receive incentives in exchange. In this direction, SPaRC was established by IWMI as part of the CGIAR Research Program on Water, Land and Ecosystems. The SPaRC initiative offers farmers a guaranteed buy-back of the surplus solar power they produce, provided they are connected to the electricity grid. It is monitoring on-farm electricity generation, income, water efficiency and crop production as part of the pilot study.

## Water Talk-2

Speaker

Shri. Shashi Shekher



Shri. Shashi Shekhar is an Indian Administrative Services officer of the Tamil Nadu Cadre, 1981 Batch and is a B.Sc (Geology) Hons degree holder. He retired as the Secretary of Ministry of Water Resources, River Development and Ganga Rejuvenation and is a key member of the Committee recently constituted by the Government of India to revise the National Water Policy 2012.

Shri. Shekhar has also served as an Additional Secretary of Ministry of Environment and Forests, Government of India and as the Managing Director of Tamil Nadu Minerals Limited, Tamil Nadu Transport Development Finance Corporation, Tamil Nadu Urban Development Fund and Tamil Nadu Urban Infrastructure Financial Services Limited. He was a Director and later Joint Secretary in the Ministry of Power from 1998 to 2003, during which period he served as the Director General of Bureau of Energy Efficiency (BEE) in charge. He has served as a Director of Power Grid Corporation of India Ltd and also have presented papers on sustainable power development at various international conferences.

# Essence of the talk delivered by Shri. Shashi Sekhar

- ◆ The non-uniform availability of water at present in the country, coupled with varying patterns of its utilization and unprecedented increase in demand, necessitates urgent need of reforms in water sector. Ground Water accounts for 60% of irrigation needs, 85% of rural drinking needs, 50% of urban water needs, contributes about 9% to GDP and is responsible for 80% increase in net irrigated area in last 40 years. Despite making surface water available by the construction of dams, canals and surface irrigation system, the dependency of net irrigated area on ground water is increasing and as of now approximately 64% area is irrigated through ground water. India extracts ground water more than China & USA combined. Indian agriculture has emerged as world's largest user of ground water to grow food and fiber. Keeping in view of ever increasing demand of water, ground water has to be managed sustainably.
- ◆ Of all the parameters influencing groundwater's occurrence and distribution, including its quality, rainfall is an important factor. Ground water availability and recharge potential is also highly dependent on geomorphology. Ground water aquifers recharge happens through mainly three sources (a) flowing rivers (b) rainfall percolation and (c) natural water holding body. The ground water recharge speed is very slow from source (b) & (c). In order to make efficient ground water management plan, it is therefore necessary to develop a robust database and highly scientific models.
- ◆ Punjab, Haryana and Uttar Pradesh are considered as green belt and have good source of water due to flat and plain land and thick alluvium. Despite receiving good rainfall and favorable geomorphological conditions approximately 70-80% of Punjab and Haryana area is water stressed. Punjab, for example, despite being well fed with river and canals, 70% of its irrigation is met by ground water.

- ◆ The case of Thanesar block, Kurukshetra, Haryana is noted for rapid depletion of ground water due to over-extraction of ground water and unsuitable cropping pattern. Based on the CGWB data it was forecasted that first layer of aquifer may get completely exhausted in 15 years if the rate of water withdrawal remains same.
- ◆ In case of Maharashtra, roughly 60 to 90 million years ago, the outpouring of basic lava through fissures formed horizontally bedded layer of basalt over large areas. Due to hundreds of years of volcanic activity, large number of vertical cracks developed in basaltic region. Due to these crack formations, the water holding capacity of upper layer of aquifer has decreased. If water is excessively drawn from these cracks, then first layer may soon run out of water, as the 1st layer cannot be recharged easily. Deccan Plateau consisting of parts of Maharashtra, Gujarat and Madhya Pradesh do not have good water recharge zones.
- ◆ In the Southern India, specifically in Karnataka the underlying rock is Granite, the rocks developed cracks over a period of time and ground water holding capacity of upper layers decreased which resulted in decrease in the water table. In 1985 water was available at a depth of 150 meters which has now gone down to a depth of over 450 meters. Due to morphological conditions also, Southern India is not a good source of ground water.
- ◆ Rivers are also a key source of ground water recharge. However, due to our mismanagement the rivers are also shrinking; Ganga has shrunk by 49%, Narmada by 58% and Kaveri by 39%. Earlier Kaveri river used to recharge large part of the ground water in Southern part of India. However, due to its untoward shrinking, ground water recharge potential has also decreased in these regions. Forest and Plantation is very much required to river to flow continuously and reduce the probability of floods. The tree covers and its roots in catchment area will facilitate the percolation of water through sub-soil system. The sub-soil system holds water for longer duration and reduces evaporation loss.
- ◆ Though water has been traditionally managed through supply side interventions, including source protection and conservation measures

such as construction of earthen bunds, percolation tanks, stone bunds, check dams, trenches, afforestation and protection of recharge zones, revival of water bodies etc., demand side intervention, like water budgeting, changing cropping pattern and efficient use of modern agricultural practices, holds even greater water saving potential for our country. Hiware bazaar, and Parambur village in Pudukottai district of Tamil Nadu, are renowned country-wide for their participatory water management approach. Similarly Parambur village is also known for its community based water management whereby community makes water budget and collectively decides which crop to be grown based on the water availability.

- ◆ Need is therefore to reconcile the supply and demand side approach alongside adoption of river basin approach for managing water resources. Further, there is also a need to understand broader ecology and inclusion of riverine ecosystem in suite of our management approach. Basin wide approach would entail significant trade-offs, however, it would ensure most optimal projects are implemented that benefit the basin as a whole.
- ◆ Some of the widely acknowledged strategies, as they fall under the domain of supply side and demand side management approach, are as follows:

### Supply side

- (a) Extensive recharge to augment GW sources- It may be done by water harvesting through rejuvenation of water bodies, construction of percolation tanks, check dams, farm ponds, preservation of natural forests, sacred groves etc to ensure sustainability and revival of water bodies under MNREGA & DoLR on scientific inputs.
- (b) Mandatory protection of ground water recharge zones in the foot hills of Bhabhar, Terai (UP), Bazadas (Maharashtra), Aravalis and Bhuds (Haryana), flood plains, marshes and wetlands etc., aquifer's recharge locations of the country. These areas may be declared as Environmental Sensitive Zones (ESZ) / GW sanctuaries.

- (c) NAQUIM may provide required technical inputs in terms of site specific recharge areas & type of recharge interventions, aquifers?capacity, rate of transmission etc. Implementation of these intervention on Mission Mode with involvement of experts and civil societies.

### Demand Side

- (a) Extensive education in water budgeting based management to manage sustainable extraction of ground water.
- (b) Promotion of Drip / Sprinkler for efficient irrigation. Government is providing huge amount of subsidy for promoting drip/sprinkler system. However the performance of these system has not been up to the mark. Public Private Partnership (PPP) model may be implemented for better performance.
- (c) Change in cropping pattern suitable to the area- Adopt food diversity to include food like maze and millets which provides iron and micronutrients. Increased consumption of these crops will create market support and thus the increase in demand will lead to shift their cropping pattern. Change in copping pattern will happen only if our eating habits are modified.
- (d) To achieve this, communication from highest level is required. Citing the example of recent success of Ganga Rejuvenation and Swachh Bharat Mission, he suggested that close monitoring from the top level of administration can drive the necessary changes.
- (e) Risk mitigation strategy.
- (f) Reducing water losses by laying of pipelines in place of open water courses in agricultural field.
- (g) Introducing regulation for subsidized electricity and financing for new tube wells.
- (h) Institutionalize Water User Associations to embark in to community management of ground water. He suggested to explore creating community level committee for each aquifer. Speaking on Governance aspect of Water, he mentioned that



water is presently a State subject, though the water is longitudinally connected from mountains in the north to sea in the South and passes through many states. Shri. Shekhar highlighted that Supreme Court has suggested that ground water be made a Common Pool Resource (CRP) under public trust doctrine with State as Trustee. He emphasized on providing training & seamless access to information to Panchayat Raj Institutions.

Concluding his address, he stated that time has come to make paradigm shift in policies and way of tackling water issues. It is Ground water that will give climate resilience, fresh water source and adaptation of climate change. The limit defined by nature while extracting ground water is to be kept in mind. There is urgent need to adopt a balanced supply and demand side interventions.



# Water Talk-3

## Speaker-1

### Professor Nayan Sharma



Professor Nayan Sharma is a Distinguished Professor with Shiv Nadar University. Earlier he was with IIT Roorkee where he supervised 174 M.Tech and 21 Ph.D. theses.

His specialization includes all facets of water resources engineering. His numerous publications find places in reputed international journals of American Society of Civil Engineers, International Association of Hydraulic Research, International Journal of Hydrology, International Journal of Remote Sensing, International Journal of Sediment Research. He is member of 64 national & international technical committees. He undertook 113 consulting and 10 major national & international Research schemes. He has published four books by SPRINGER & INCID.

Indian Society of Hydraulics conferred him with prestigious Jalvigyan Puraskar Award and S.N. Gupta Memorial Award in recognition of his research contribution to river engineering.

# Essence of the Talk delivered by Dr. Nayan Sharma

- ◆ India faces many challenges, issues and flaws in irrigated agriculture, industrial sector, hydro power and river management approach. The per capita availability of water is decreasing sharply leading to water scarce conditions and therefore implementation of sound water conservation initiatives has become immensely important.
- ◆ Irrigation techniques like Regulated Deficit Irrigation (RDI) and Partial Root Zone Drying (PRD) can play a key role in water conservation. Use of Drip / Sprinkler also need to be promoted for increasing Irrigation efficiency. Studies suggest that implementation of these techniques will increase water utilization efficiency upto 98% from existing 30%.
- ◆ Hydro power sector on the other hand also wastes lot of water, and this wastage can be reduced by implementing Pumped Storage Power Plant (PSP) in hydropower sector. By using PSP we can increase the installed capacity of India by another 1 lakh megawatt.
- ◆ Existing storage capacities also need to be augmented for conserving water. This need to happen pari passu with the implementation of Flood Cushion Measures using Piano Key Weir & Fuse Plug. Fuse Gates techniques result in the increase in the storage capacity as high as 20-30%. The New Piano Key Weir Technology has been successfully implemented in Sawra Kuddu Hydro Project of HPPCL, Himachal Pradesh. This technology can be incorporated in existing 5000 dams and barrages in India to increase storage capacity. These technologies not only increase storage capacity but also help prevent floods.
- ◆ For navigation fairway development & pollutant dispersion with reduced stream flows, innovative river development solutions need to be explored.
- ◆ Planners and engineers should keep in mind place-specific diversities of India while installing these techno-centric solutions.

## Water Talk-3

Speaker-2

Shri. Pradeep Gandhi



Shri. Pradeep Gandhi was a member of the 14th Lok Sabha of India, representing the Rajnandgaon constituency of Chhattisgarh. He was member of Chhattisgarh Legislative Assembly in 2004. He also held the position of Chairman, Zilla Parishad Rajnandgaon, Chhattisgarh from 1993-1999. He is associated with 'Prithvi foundation' that that has initiated water conservation work based on the 6P's (Public, Private, Panchayat, Profitable, Progressive, and Partnership) model villages in Chattisgarh. His organization also organizes training/awareness programmes by inviting experts from various sectors to inspire communities.



# Essence of the talk delivered by Shri. Pradeep Gandhi

- ◆ Prithvi Foundation has initiated water conservation work based on 6P (Public, Private, Panchayat, Profitable Progressive Partnership) model in villages of Chhattisgarh.
- ◆ The success story of Margaon model of Water Conservation hinges strongly around the principles of collective actions for water harvesting which can be an ideal model for the other panchayats in the future. Replication of this model will therefore require strong community participation in other areas.
- ◆ This methodology yielded additional benefits in terms of increased productivity of the crop ensured from increased soil health derived from pond restoration works. The effort of Prithvi Foundation has received positive response from the community and people are submitting proposal for building ponds in their village. The good initiative towards water conservation of one village is promoted through various means like organizing seminar, performing Kalash Yatras, making human chain, organizing rallies by engaging all stakeholders. Prithvi Foundation also organizes training/awareness programme by inviting experts from various sectors to inspire community people.
- ◆ In near future, motivated gram panchayats can execute more effective work on their own with very nominal cost and in absence of any subsidy benefits.



## Water Talk-4

Speaker

Dr. Anil Joshi



Shri. Anil Prakash Joshi is an Indian green activist, social worker, botanist and the founder of Himalayan Environmental Studies and Conservation Organization (HESCO), a Dehradun-based NGO founded in 1979 and involved in the development of environmentally sustainable technologies for the agricultural sector. He believes that local economy and ecology can only grow when it is local resource based. He connected local market, local wisdom with new S&T and local resource to effect the same. His slogan is 'local needs, met locally'. Shri. Joshi has launched several social programs, based on resource-based rural development, such as Women Technology Park, Technology Intervention for Mountain-Eco System, Ecological Food Mission in Mountain and Women's Initiative for Self Employment (WISE) and has been successful in providing the villages with water mills, composting pits, toilets, plan-based drugs and herbal pesticides and rainwater harvesting techniques. Finding uses for a local shrub, Kurri, which had been considered a weed, by utilising it for making furniture, incense sticks and using the left-overs as fodder was one of the initiatives developed by him.

Shri. Joshi is a recipient of the Jamnalal Bajaj Award and is an Ashoka Fellow. The Government of India awarded him with Padma Bhushan 2020 for social work in Uttarakhand and also with the Padma Shri, in 2006, for his contributions to Indian society.

# Essence of the Talk delivered by Dr. Anil Joshi

- ◆ The world has made advancement in the Science, however, we have not been able to understand the Science of the Nature. There is no difference between Nature and God however, human attitude has been very different towards nature. Therefore, there is an urgent need of becoming consciousness about the benefits of a healthy environment and understanding the importance of natural resources being provided by the surrounding ecosystems. However, the development plan of policy makers continue to be based on the development model of cities and overlooks the loss of natural capital or its status and Ecology. There is an urgent need to make the policy makers and the residents living in plains, who uses the eco-services provided by Himalayan ecosystems, realize the significance of ecological health of mountainous regions with regard to their forests, water, air and environment as a whole. Efforts need to be up-scaled to integrate and disseminate scientific tenets of managing Nature if water crisis as seen in Kedarnath, Cape Town, Chennai and Shimla needs to be avoided.
- ◆ The rivers are our history, present and future and have been serving human civilizations for over the centuries. However, the current situation of rivers is appalling as evident through 57 major rivers which are on the verge of extinction with shrinking catchment areas. Mississippi river of USA, Yellow river of China, Kemps river of Australia and a number of other big rivers of the world are endangered. Current development activities have been polluting rivers carelessly, and time has come for Societies to come together in conserving and managing water. Rivers functions as an artery for any nation, and therefore there rejuvenation need to be given priority.
- ◆ There is a significant and worrying lack of public consciousness in this direction, especially state alone cannot solve the crisis. Since nature belongs to everyone, the Society has to participate and contribute in water management by creating ponds, wells, tanks,

rejuvenation of river bodies etc. Water management is a collective responsibility and people including industry and individuals should be made accountable and responsible for the same.

- ◆ Forest cover is one of the most important contributors in conservation of water. Forests are disappearing at an alarming rate and the local communities are suffering most from the degraded environment. Though Government of India had introduced an act in 1982 to ensure that 33% of land in each state would remain under forest cover, however, most of the states have forest cover little more than 10%. The quality of air and soil has also degraded acutely over the last two decades. He said it is our collective failure that despite the presence of a forest policy, the forest cover has not increased. Besides, local people do not participate in preventing forest fires. Excessive use of chemicals and fertilizers are also causing havoc on the quality of soil and lack of knowledge sharing and awareness initiatives are a major reason for mass degradation of soil health. Government has also failed to develop adequate and timely initiatives to prevent land degradation.
- ◆ Resource depletion is jeopardizing rural livelihood but there is no ecological accounting in our Gross Domestic Product (GDP). Environment and Agriculture are strong pillars of the Indian economy, however, these are not given due importance while calculating the economic growth of our country. Accordingly, India needs to introduce the concept of Gross Environmental Product (GEP) to indicate overall health of environment in India. It is high time that the country and the States collect data on forests cover created, amount of rain water harvested, number of springs revived, ponds and wells created/rejuvenated, number of trees planted, water sources created, quality of air & soil, and measure the GEP to assess the health of common eco-systems.
- ◆ HESCO has worked to revive a small river in Uttarakhand which earlier used to cater to the water needs of 18 villages, but later on dried on account of a number of reasons. Recognizing rain water as the biggest source of water, HESCO in collaboration with Forest Department of the Government of Uttarakhand dug pits of 1 cubic



meter in all the catchment area, thus creating 3200 pits in 10 hectare to store crores of litres of water. The efforts has resulted in increased in flow in the river, reduced erosion of the soil in rainy season and created favorable conditions for planation. Water flow rate from the rejuvenated river has increased from 100 litres/min to 900 litres/sec. The forest Department of the Government of Uttarakhand replicated similar model by digging up almost 20 lakh trenches in the chir-pine dominated forests to replenish these trenches with rain water to create moisture near the chir-pine trees and prevent further occurrence of fires. The initiatives of HESCO has resulted in the revival of a number of Dharas and water bodies in Uttarakhand and other States.

- ◆ Due to revival of the rivers, the available water is used to run water mill. HESCO is also providing solution for upgrading the local water mills to make it an effective tool for grinding work as well as power generation and provided indigenouselectricity to the villages. Till now, HESCO has completed large number of projects and reached 4000 villages through water mills. There are approximately 83000 shrines in India where produce from staple crop Maize could be used as prasad. Such efforts on pilgrim-centric rural economy has resulted in the employment generation as well as opened diverse sources of income for the villages cultivating millets and grains.
- ◆ Initiatives like Water Talk are welcome as this promotes a forum for dialogue, discussions & debate, and advocated that similar initiatives should be taken by other Departments/Ministries. Education systems needs to build a system of cultural inclusiveness for promoting cross-cultural engagements.
- ◆ The Ministry can establish a Nation-wide Jal Jan Kendra in collaboration with good institutions which are connected with local villages, having science as basis and implementing the practical solutions. The Jal Jan Kendra should provide education on water and disseminate the information on various aspects of water and issues/ challenges/ solutions and best practices. The center should also create disseminate disasters related warning, and build awareness on the critical water scenario.

## Water Talk-5

Speaker

Dr. Tushaar Shah



Dr. Tushaar Shah is trained as an economist and public policy specialist. He is a former director of the Institute of Rural Management, at Anand, Gujarat, India and presently is the Senior Adviser to the Director General at the Colombo-based International Water Management Institute. Over the past 25 years, Dr. Shah's main research interests are in water institutions and policies in South Asia, particularly, India, Pakistan, Bangladesh, Sri Lanka and Nepal, a subject on which he has published extensively. More recently, his interests lay in comparative analyses of water institutions and policies across Asia and between South Asia and Sub-Saharan Africa. Dr. Shah has also worked extensively on energy-irrigation nexus in India. Dr. Shah was honored with the Outstanding Scientist award of the Consultative Group of International Agricultural Research (CGIAR) in 2002. Shah serves on the boards of several academic institutions and NGOs and is a director on the board of the ICICI Bank.



# Essence of the Talk delivered by Dr. Tushaar Shah

- ◆ There is little scope to resolve outstanding issues in water sector in country without acting in the energy sector. The efforts of Ministry of Jal Shakti (MoJS) to bring water institution together will not be sufficient, and MoJS and Ministry of Power needs to discuss about the approach to be adopted to resolve the issues which are closely intertwined.
- ◆ At the time of independence, India had largest surface irrigation infrastructure and world's largest canal network. Surface irrigation was most important driver of irrigated agriculture in India, however since 1960, transformative changes occurred and there has been an exponential growth in the use of ground water. Presently, India uses more ground water than United States and China put together. Apart from improving the performance of Government's irrigation system, our main challenge is to fix the ground water sector. The ground water economy is completely unmanaged and our major challenge is to properly manage the ground water economy by finding ways through which State/Central Governments could bring behavioral changes amongst ground water users.
- ◆ Lack of monitoring mechanism/ technologies of ground water allocation and use in India is unpalatable. Due to large no of tube wells (around 25 millions), the cost of monitoring them becomes very high and its management becomes difficult. Ground water economy uses almost quarter of the energy produced in the country. Therefore, the role of energy sector & manager of distribution companies becomes critical in ground water management. Apart from electricity, there are massive energy implications of ground water irrigation economy in the form of diesel utilization (5-8 billion liters) and generation of carbon footprint (9% from agriculture out of which 6% due to pumping of ground water). If India wants to pursue a path of carbon efficient economic growth then it needs to start

paying attention to how energy is used for ground water irrigation.

- ◆ Of all the major drivers for massive use of ground water in India, high population density on agricultural land is a principal driver for demand. Due to small size of land holding, farmers are forced to over-exploit the agricultural land in order to make their living, and depleting ground water for this purpose. Canal system, on the other hand, provides water only for 3-4 months in a year thus increasing the dependency on ground water.
- ◆ Due to high demand of on-farm irrigation, informal irrigation system got developed where farmers/individual owns and manage the irrigation system. The informal irrigation system which is 3-4 times bigger than formal government irrigation system and the informal system has cannibalized the government irrigation system.
- ◆ Rapid decline in the maintenance of the irrigation system has been another major contributor to the use of ground water. Poor recovery of irrigation service fees (ISF), low value of crops irrigated and low yearly maintenance allocation in respect of capital investment has led to a decline in the maintenance of already built irrigation system.
- ◆ Heavily subsidized electricity/free electricity to the farmers in most parts of the country are major contributing factors in ground water depletion and it has resulted in the rampant ground water over-exploitation and deteriorating finances of electricity utilities. In the past 20 years, there was an energy divide in the irrigation economy of the country. Parts of the country where ground water is scarce, we provide energy at throw-away price 'while in states like Bihar, UP, West Bengal and Odisha where ground water is available in abundance, farmers are poor and High cost of electricity is impeding the use of ground water.
- ◆ Some of the major symptoms of careless ground water management are as under:
  - Dependency of agricultural economy on subsidies.

- Depletion of aquifer.
  - Bankruptcy of Electricity Boards and electricity distribution companies.
  - Massive wastage of power and water.
  - Anarchy on rural feeder.
  - High fiscal deficit in some states due to higher budgetary allocation for paying.
- ◆ The situation can be still be salvaged if irrigation tube wells are metered and farmers are charged for power consumed in irrigation. However this will require political will and in the present scenario, States are unlikely to take such a decision. Only West Bengal has started charging day time full commercial tariffs from the farmers. But this was possible since the number of electric tube wells were less in West Bengal (nearly 10,000).



## Water Talk-6

### Speaker-1

### Shri. Popatrao Baguji Pawar



Popatrao Baguji Pawar is the farmer Sarpanch of Hiware Bazar, a gram panchayat, 17 kms away from the HQ of Ahmednagar district of Maharashtra, since 1990. He is also the Executive Director of Maharashtra state government's Model Village programme. He is credited to have transformed it from an impoverished village into a model of development that the government of Maharashtra wishes to implement across the state.

Pawar led Hiware Bazar's transformation from a drought- prone village to a green and prosperous model village, thus successfully reproducing Anna Hazare's Ralegaon Siddhi model of village development. He is also featured in an India Today cover story as the person who demonstrated how rural water resources could be revived.

The Hiware Bazar Gram Panchayat, under Pawar's leadership won the first National Award for community led water conservation in 2007. Shri Pawar was awarded with Padma Shri in 2020 by the Government of India.

# Essence of the talk delivered by Shri. Popatrao Pawar

- ◆ In the 1972-1989 period, Hiware Bazaar was a water scarce village. The village faced extremely difficult situation due to recurring periods of drought because of irregular rainfall (Average rainfall 350-400 mm). There was no source of income for the people. Scarcity of drinking water, non-availability of fodder and fuel wood made life of village inhabitants miserable. This led to large scale migration of people to urban areas. Those who stayed back were forced to indulge in bootlegging to make their living. Most of the villagers became alcoholic which resulted in increased incidences of crime and domestic abuse. Conditions of the primary education and health facilities were also pathetic. The gloomy situation made people prone to violence and angry against the system. Fearing for their safety, Government servants refused to take postings in this village and used to go on leave, if they were posted to the village.
- ◆ Sri Popet Rao Panwar, who had moved out of the village, returned to stand as sarpanch in the 1989 Panchayat elections. Villagers, impressed by the vision put forward by Sri Panwar, unanimously elected him as the Sarpanch.
- ◆ On 26th January 1990, the first Gram Sabha was held and the following basic needs were identified and prioritized: Drinking Water, Fodders to Cattle, water for Agriculture, Educational Facilities, Health Facilities, Village Roads, Electricity, Employment and facilities for social and cultural activities. Planning for the 1990-95 five year period of was discussed and approved by the village panchayat.
- ◆ They adopted “Pancha Sutra as the basis for their development :
  - (i) Population Control,
  - (ii) Take control, responsibility and arrogate ownership of the natural resources of the village,
  - (iii) Total ban on digging Bore wells for irrigation purposes,

- (iv) Ban on Water Intensive crops like Banana and sugarcane and
- (v) ban on selling land to outsiders.

- ◆ The village decided to focus on EGS and education. The main thrust was on making continuous contour trenches (CCT), deep CCT, earthen bunds, percolation tanks, check dams, artificial aquifer blast and other Soil and Water Conservation and taking up tree Plantation on a large scale using funds from EGS Scheme, Ideal Village scheme of State Govt. through Yeshwant Watershed Development Trust. All these works were implemented the villagers only.
- ◆ Since 1992, based on the concept of “Village Development through people’s participation and Government’s participation in Village Programmes”, the implementation of Adarshgaon Yojna was adopted up in the village.
- ◆ To make data based decisions, the annual rainfall figures were collected by installing 3 rain gauge stations at sub basin level and works prioritized by the gram sabha in a democratic way.
- ◆ All these efforts yielded considerable increase in water level, cropping intensity, fodder availability and milk production. There was a rise in water table from 70-80 ft. to 20-25 ft. With the change in cropping pattern from Jawar & Bajara to Onion, Potato, Horticulture, vegetable, floriculture, the cropping intensity increased yielding good income for the farmers. Increased availability of fodder (from 1500 to 6000 mt) resulted in increased milk production (from 300 lit. to 3500 lit./ day) and higher income to landless people.
- ◆ Families stopped migration to urban areas and those migrated from village also came back.
- ◆ Due to economic gain, standard of living of villagers improved.
- ◆ The village has become green, water sufficient and socially and economically developed. It’s a perfect model of sustainable development.
- ◆ As the Hiware Bazar model gained publicity and lives of people of



the village visibly improved, it became the learning center for Indian and Foreign research institutes and many senior officers and celebrities began visiting this model village. This further enhanced the self pride of the villagers and thus ensuring the sustainability of the reforms done so far.

- ◆ Popat Rao is now invited to make talks and presentations on the success story of Hiware Bazar. He has been visiting and guiding many other villages to follow the Hiware Bazar model.
- ◆ These villagers have to adopt the 7 Principles of social discipline (Saptasutri) :
  - (i) family planning and population control,
  - (ii) voluntary labor for community work,
  - (iii) ban on alcohol usage and illegal brewing,
  - (iv) ban on tree cutting, b
  - (v) an on free grazing,
  - (vi) ban on open defecation and
  - (vii) ban digging of bore well for agriculture.

These have to be followed without any compromise.

- ◆ His guidance has spawned success stories in Sakhara village, (Washim district); Godhani village (Nagpur), Kingaoan (Aurangabad), Nivdungewadi (Ahamednagar), Davangaon (Latur), Kothoda (Yavatmal), Khor (Buldana) and Bhagi (Pune).



## Water Talk-6

### Speaker-2

Shri. Umakant Umrao (IAS)



Shri. Umakant Umrao is a 1996 batch IAS officer belonging to the Madhya Pradesh Cadre, presently posted as Secretary, P & RD & CEO MPRRDADA, Madhya Pradesh. While he was Posted in Dewas as a collector in 2006, the IIT Rourkee graduate taught farmers how to convert a part of their land into pond for irrigating the rest of their fields thus making an economically viable & environmentally sustainable water conservation model. Shri. Umrao's initiative helped solve the drought-like situation in Dewas with his campaign 'Pani Bachao, Labh Kamao' drawn on the lines of economics of water.

'Pani Bachao, Labh Kamao' initiative was also praised by Prime Minister Narendra Modi in one of his Mann Ki Baat radio addresses. The United Nations had selected Dewas district's community water management works in the best three water management practices in the world under the category of 'Best Water Management Practices' for 2011-2012.



# Essence of the talk delivered by Shri. Umakant Umrao

- ◆ Dewas lies in the western part of Madhya Pradesh and around 2006 when Shri. Umakant Umrao joined as Collector, the region had been facing drought for the last 4 years. People were migrating to nearby regions and the situation was so alarming that drinking water was being delivered by train to Dewas. Groundwater level had dropped from 100 ft to 800ft. There were around 70 to 80 bore wells per family. In this region, cultivated land was around 4 lac ha and out of which only 50,000 ha of land was irrigated by canals.
- ◆ Out of 100 litres of water which India receives from rain water, only 15 to 20 litres reaches to the field through canal network and therefore the problem of water scarcity exists. Hence, there is a need to develop a model through which additional 30 to 40 litres of rain water can be utilized. Water use efficiency of rain water is very less because we only focus on water available at river basin level.
- ◆ On an average our country receives around 35 crore-ha-m of rain water every year and our consumption in today's date is 12 crore-ha-m only, thus making India a water surplus country.
- ◆ Hence there is tremendous scope for storing rain water. There is a need to have a technical model for water conservation cum harvesting which is economically viable for individuals to invest.
- ◆ In today's materialistic world, Profit for self is the only driving force for people. There are more than 4 crores bore wells which are formed not by the initiatives of the government, but dug by people at their own cost, due to their profit making mind set. The cost to dig 4 crore tube wells is around Rs 8 to 10 lacs Crore and had this money been used to create water harvesting structures, there would not be any water scarcity now. Hence, India requires a model in which individuals can harness profits by rain water harvesting.
- ◆ Big dams are a costly solution to irrigation issues. This also involves land acquisition, land submergence, displacement of people and

other environmental issues. Due to high temperature, there will be lot of loss of water due to evaporation and less water efficiency in India compared with countries like Australia, Brazil, Canada, China and USA.

- ◆ There is a clear emergency to take further actions and to do demand side management as few recent research studies says that only 25% of groundwater is available and in next 10-15 years it's going to exhaust completely. In Latur, only 7% of groundwater is available which was recharged from the last 100 and 1000 of years and in last 30-40 years all of it was exhausted. The water problem is not by drinking or civic needs, but due to Agricultural water demand i.e. 80-90 % and this is linked directly to profits. Of the land available for cultivation, India is utilizing only 50 % as cultivable area, and 70-80 % of it is irrigated by groundwater and rest by river basin water. Though India has already harnessed 100% of water available in river basins by constructing large number of dams, it is still able to irrigate only 20% of cultivable area. So there is no scope in improving the capacity at basin level.
- ◆ Confined aquifers require hundreds of years to recharge and in India almost all confined aquifers are depleted. Dewas has river basin which is based on confined aquifers. All rivers which are confined aquifer based are nearly 80-90 % depleted or lost. Narmada has 123 tributaries and in today's time no tributary has water.
- ◆ The solution to this problem is increasing pond efficiency. A well designed pond can ensure availability of 30 to 40 litres of water out of 100 litres of rainfall water for irrigation. A pond can be used to collect water from 1st order stream and pass the water to field. Therefore, there is a clear need to have a technical model for water conservation cum harvesting which is economically viable option for individual to invest. To make pond profitable, the pond should be located at right place, should have right depth and size.
- ◆ Hence, India needs a model which is individual centric, profitable and acceptable to Indian farmer.

- ◆ So he embarked on a scheme for motivating the farmers to construct small irrigation tanks with their own investment, in their own land, for their own Economic Development. Every farmer was to allocate some part of his/her farm to make a small rain water collection reservoir, to be used for agriculture in his field.
- ◆ Now there are 15000 small irrigation tanks/ ponds in Dewas district only. As a result of this initiative, water table has risen by 6 to 40ft in different locations. Irrigation potential generated is 200000-250000 liters. Milk production and crop production has also been increased due to this initiative.



## Water Talk-7

Speaker

Shri. Sonam Wangchuk



Shri. Sonam Wangchuk is an engineer, innovator, environmentalist and an education reformist. He is the Founding Director of the Students' Educational and Cultural Movement of Ladakh (SECMOL) which was founded in 1988. SECMOL strives to rebuild the lost pride and self-confidence of the students of Ladakh through its educational reforms programme. He is also known for designing the SECMOL campus that runs completely on solar energy and uses no fossil fuels for cooking, lighting or heating, even in Ladakhi winters when temperatures fall to minus 25C degrees. Shri. Wangchuk was instrumental in the launch of Operation New Hope in 1994, a triangular collaboration of government, village communities and the civil society to bring reforms in the government schools system. This movement led to raising the all important 10th grade exam results in the region from 5% success to eventually 75%.

Shri. Wangchuk is the winner of the prestigious Rolex Award for Enterprise 2016 for the ambitious Ice Stupa Artificial Glacier Project in Ladakh.

# Seventh Water Talk delivered by Shri. Sonam Wangchuk

- ◆ Ladakh is a cold high altitude desert and people live here in harmony with nature. Farming and livelihood here depends on the melted water of glaciers and they had sufficient amount for their requirements.
- ◆ But in the recent years, they are facing huge water problems. Due to the effects of climate change, for which these villagers who respect the nature are not at all responsible, there is large scale melting of glaciers and the glaciers which were near to villages have receded far away. As a result, most of the villages face acute water shortage, particularly during the two crucial months of April and May when there is little water in the streams and all the villagers compete to water their newly planted crops. But by mid-June there is an excess of water and even flash floods due to the fast melting of the snow and glaciers in the mountains. By mid-September all farming activities end, and yet a small streams flow throughout the winter steadily emptying into the Indus River without becoming of use to anybody. The problem is getting worse with time, as Himalayan glaciers are disappearing due to global warming and local pollution. Thus the need to adapt and innovative water conservation methods was felt to overcome this hardship.
- ◆ Ice-Stupas are developed locally as an innovative water conservation technique. Ice Stupa is a form of glacier grafting technique that creates artificial glaciers, used for storing winter water (which otherwise would go unused) in the form of conical shaped ice heaps. The water is collected and formed into conical structures making use of elementary principles of physics and earth's gravity and hence does not require any electricity for its formation.
- ◆ During summer, when water is scarce, the Ice Stupa melts to increase water supply for crops.

- ◆ Ice can last longer in Ladakh if it could be shaded from the sun. Since providing shade to larger water bodies was not possible, Iced-water was stored in the shape of a cone which offers minimum surface area to the sun whilst holding high volume of water.
- ◆ These Ice-Stupas need very little effort and investment, and can be used to provide water for agriculture and other uses in early summer. The ice stupas are formed using glacial stream water carried down from higher ground through buried pipes, with the final section rising vertically. Due to the difference in height, pressure builds up and the water flows up and out of the pipe into sub-zero air temperatures. The water then freezes as it falls to gradually form an ice cone or stupa. In late spring the melt water is collected in large tanks and then fed onto planted land using a drip irrigation system.
- ◆ Building on the concept, first prototype of 6 meters (20 ft) Ice Stupa was created in October 2013 by freezing 150,000 liters in Leh without any shade from the sun. The water was piped from upstream using gravity. Electricity or machinery was not used for pumping water. The Ice Stupa did not melt fully till 18 May 2014, even when the temperature was above 20 °C (68 °F).
- ◆ Convinced about the efficacy of the principle, the vast land near Phayam Monastery was developed into an Ice Stupa farm. USD 12500 was raised with the help of crowd-funding between 12 October, 2014 and 22 December, 2014 for taking up the project. Villagers worked throughout the winter of 2014-15 period to lay 2.3 kms of pipe line from the water source to the Ice –stupta farm. By 5 March, 2015, when it was blessed by HH Drukung Che Tsang Rinpoche, the great Buddhist monk of the area, the ice-stupa had grown into 64 feet high and held 2 million liters of water as frozen ice in it in the shape of a large cone. These ice-stupas were adorned with traditional Buddhist flags, which not only manifested as blessings of Gods, but also provided much needed covers to protect the ice-stupas from the sun, to prevent its melting. Thus the marriage of science and tradition ensured the much needed water



for the Phayam village throughout the year for cultivation and drinking.

- ◆ Shri Wangchuk got the prestigious Rolex Award for Enterprise 2016 for this ambitious Ice Stupa Artificial Glacier Project in Ladakh.
- ◆ Students' Educational and Cultural Movement of Ladakh (SECMOL) was founded in 1988 by a group of young Ladakhis returning from university who understood the problems of the younger generation. SECMOL aims at reforming the educational system of Ladakh with the principles of modern education by helping youngsters confront the issues of lack of focus and prevalent cultural-identity confusion. SECMOL's activities include working to reform the government school system, helping village students in their education, awakening youth to the problems stemming from inappropriate and insensitive schooling, producing related videos and radio programs, and designing and building solar-heated eco-friendly buildings.



## Water Talk-8

Speaker

Shri. Heera Lal (IAS)



Shri. Heera Lal (IAS) was promoted to IAS in 2016 and worked as District Magistrate of Banda district in Uttar Pradesh. During his tenure as DM from 30-8-2018 to 22-2-2020, he made many innovative initiatives like the Kua talab Jiyo Abhiyan etc which made water conservation a people's movement in the district. His work in the field of water got him awards like Smart Cities India Awards 2019 for Bhujal Badhao, Peyjal Bachao Abhiyaan and Habitat for Humanity India Innovation and Impact award 2019 etc. He is presently posted as Addl Project Director, UP AIDS Control Society.



# Essence of the Talk delivered by Shri. Heera Lal

- ◆ Banda district is one of the worst drought affected districts in Uttar Pradesh in the Bundelkhand region. Due to scarcity of water agriculture has suffered and people driven to poverty.
- ◆ Building on the successful campaigns for increased voter turn-out for the Lok Sabha elections in 2019, and the Start-up and innovation summit 2019 in Banda, the district administration initiated the “*Kuan Talab Jiyao Abhiyan*”- the local water conservation campaign in Banda district and turned it into a people’s movement.
- ◆ With the help of water experts and technical support of INGO Water-Aid, the district authorities trained local people to dig pits in and around the areas close to hand-pumps and taps. This helped in creating small storage capacity for water recharge during rains. Campaigns were launched in all 8 blocks of the district and training workshops were organized on technical aspects of the activity. The concept of “water budgeting” was introduced in villages to make people understand the importance of water conservation and help track the consumption of water against the availability of water.
- ◆ A core team of senior officers was set up to monitor the implementation of the campaign. Regular meetings were conducted at the district, block and village level to educate people about the importance of water and motivate them to conserve water. As model gained popularity, Global water organizations started visiting Banda to study this model of water conservation.
- ◆ Journey towards making Banda and its people water-sensitive entailed designing innovative mechanisms and techniques to conserve water.
- ◆ Traditional appliances of storing water in utensils like ‘lota’, ‘magga’, ‘balti’ were promoted for installations at homes. Similarly, “ponds” and “wells” were used as traditional water-storing systems

in a village. These natural storing “containers” are currently being rampantly destroyed. People of Banda were made to recognize this through massive awareness campaigns and became, therefore, encouraged to revive ponds and wells.

- ◆ The idea of “first digging ponds and wells in the minds of people” was to firmly entrench the importance of ponds and wells into the minds and hearts of people so that they themselves will be motivated to revive these “natural water containers” in their villages.
- ◆ The “*Kuan Talab Jiyao Abhiyan*” campaign was kick-started on 22 June 2019 with a Jal March. On 27 June and 6 July 2019, Deepadan Karyakram was held wherein people lit “diyas” in front of wells or ponds and paid respects to the “old traditional water containers”. Jal Mahotsavs and Jal Goshtis were also organised as a part of this campaign. The movement aimed to revive the water bodies of the area by trenching, cleaning and other efforts.
- ◆ If such models of reviving ponds and wells are institutionalized elsewhere, there will be no need to build large dams.
- ◆ Villagers were encouraged to work collectively towards water conservation. Special efforts were made to involve women in the campaign as they are primary users of water. Villagers of all the 471 gram panchayats were involved in this movement.
- ◆ The movement was supported by a local statement which went like this: “*Kuan talaab mein paani layenge, Banda ko khushhaal banayenge*”.
- ◆ People’s traditions and customs should be connected with their usage of wells and ponds to increase their understanding of the importance of these two sources of water in their lives. The tagline used in the campaign was “Paani ka punya kamao.”
- ◆ Using mass awareness tools like handbills, caps, T-shirts etc., the campaign created a mass appeal. Public events were organized to promote water conservation and preservation. To maintain uniformity, an SOP was designed for all the Gram Panchayats in

the district. All Gram Panchayats were directed to organize periodic meetings (*Chaupals*) next to a public well in the morning. *Pradhans & Sachivs* of all 470 Panchayats were invited for a meeting organized on the topic of water conservation in the district.

- ◆ *Pradhans* and *Sachivs* were accordingly encouraged to direct MGNREGA funds to do water conservation work. *Pradhans* were made understood to work on storage of water along with focusing on sewage and road construction. People were asked to do “*Shramdaan*” and work towards increasing groundwater. Rich farmers were motivated to construct ponds in their own farm lands. Likewise 2000 ponds have already been constructed in the village till date.
- ◆ As the rainy season began, the focus was shifted towards rainwater harvesting. Apart from generating awareness and promoting the use of traditional water storage systems like ponds and wells, the goal was also to promote rainwater harvesting. All these activities led to a considerable increase in ground water level of the district.



## Water Talk-9

Speaker

Dr. Himanshu Kulkarni



Dr Himanshu Kulkarni is the Executive Director and Secretary at Advance Centre for Water Resources Development and Management (ACWADAM), Pune. He has been actively involved in the advocacy for stronger programs on groundwater management in India, through his inputs, more recently as Chairman, Working Group on Sustainable Groundwater Management for India's 12th Five Year Plan. He has been working in the field of Groundwater management for nearly 30 years now.

He holds a PhD in groundwater, has travelled to the US on a Fulbright Scholarship and to Austria as a UNESCO scholar.



# Essence of the Talk delivered by Dr. Himanshu Kulkarni

- ◆ ACWADAM works on the subject of ground water management with the primary goal of bringing communities closer to aquifers by training, capacity building and generating research data.
- ◆ There is a pressing need to change perception about the concept of water resource management and contextualize water and agriculture in terms of ground water availability. According to data, nearly 1000 km<sup>3</sup> of water is extracted across the world annually. Nearly 70% of the annual global groundwater extraction is used in agriculture, of which more than 50% is in Asia alone and over 200 km<sup>3</sup> of groundwater is extracted for domestic water provisions, including drinking water.
- ◆ India alone contributes to 25% of global groundwater extraction making it largest extractor of ground water since 1980s. As per one of the CAG report, 98% of rural drinking water comes from ground water, 70% of water used in agriculture is ground water whereas 48% of water supply share is groundwater in the urban space. The above data makes India the most groundwater dependent country in the world.
- ◆ Data shows that the number of individual dug-wells drawing water has increased in comparison to group dug-wells. Nasik has the highest number of dug wells in India. This emerging trend of individualization of ground water resources is going deeper which is a matter of concern. Water crisis exaggerates the competition between demand and supply of the dwindling availability of water.
- ◆ Some of the broad impacts of India's ground water crisis include:
  - Increasing vulnerability to the combination of aquifer depletion and contamination.
  - Unhealthy competition and potential conflict.
  - Endangered basic water security at all scales and levels.
  - Health hazards from contamination.

- Ecosystem impact, mainly depleting base flows.
  - A diverse and variable socio-ecological environment.
- ◆ There is a growing recognition to bring in an alternative perspective and talk about the water source than the resource itself. Groundwater presents itself as a paradox wherein an increase in the number of sources would create a division in the resource, in turn further decreasing the yield. The consequences of common pool resources are increasing dependency and decreasing availability.
  - ◆ Ground water can be given identity through aquifers which in itself depends on the varying geological and hydro-meteorological conditions in a region. Aquifer profiling is must as it helps to develop bespoke protection-management strategies. Aquifers are diverse in nature and wells in a single aquifer show different yield behavior due to variability in storage and transmission character. It means that fragmentation of land leads to unequal access to the same resource. 70% of India's available ground water is vulnerable to depletion and contamination. Aquifers can be studied through many dimensions including its recharge and abstraction quality.
  - ◆ The annual domestic demand of water in a typical Indian village is less in comparison to the agricultural requirement. The agriculture sector demands 528 mm of water per year and with current changing trends in agro economy, the demand for water has further increased. There is an emergence of irrigated crops that demand large amount of water at the expense of nutri-cereals.
  - ◆ The source of a river is acknowledged by springs. 60-70% of Himalayan population depends on springs and spring depletion is directly connected with the health of the aquifer. Spring discharge depletion would accordingly mean depletion of the most reliable climate buffer in the mountain regions.
  - ◆ Competition and conflict over groundwater can be inter-sectoral and intra-sectoral. The aquifer properties and socio-economic factors determine the nature of competition. Individuals adapting to groundwater depletion or contamination often drive competition. Competition & conflict are often related with issues of equity,



fairness and justice can be extenuated with formal regulations and better governance. However, one solution could be that we treat the entire community as a resource. Community based participatory management has the capacity to change competition into participation. The legislation must complement participatory social norms. Participatory ground water management will comprise of the required scientific knowledge, community and community level engagement and will have the capacity to influence rural government systems like Panchayats.

- ◆ Across a diverse aquifer typology, groundwater can be perceived in two ways; Groundwater as ecosystem in which the aquifers are themselves the ecosystems & Groundwater in ecosystems wherein the aquifers lie within the layer of systems of ecosystems.
- ◆ Moving towards a system of community-based groundwater management is the need of the hour. A new mission statement be created which focuses on capacity building, partnerships, generating awareness, knowledge, skills and engages communities on ground. Further, improving community engagement would help improve overall resource management efficiency.



# Water Talk-10

Speaker

Dr. Mihir Shah



Dr Mihir Shah was the youngest ever Member of the Planning Commission, Government of India, and held the portfolios of Water Resources, Rural Development and Panchayati Raj. Dr. Shah was chiefly responsible for drafting the paradigm shift in the management of water resources enunciated in the 12th Five Year Plan. He also initiated a makeover of MGNREGA with a renewed emphasis on rural livelihoods, based on construction of productive assets. In 2015, the Government of India invited him to chair a Committee on Restructuring the CWC and CGWB and also to chair a Committee to draft the National Water Framework Law and the Model Groundwater (Sustainable Management) Bill, which are currently under the active consideration of the GoI.

Dr. Shah was a Member of the International Steering Committee of the CGIAR Research Program on Water, Land and Ecosystems from 2012 to 2018. He serves on the Governing Council of the Srishti Institute of Art, Design and Technology, Bengaluru and the Academic Council of the Ambedkar University, Delhi.

# Essence of the Talk delivered by Dr. Mihir Shah

- ◆ Changing climate will exacerbate the pressures of industrialization, population growth and protracted conflicts on country's water resources.
- ◆ From a post-colonial perspective, technological fixes had occupied a central position in our endeavor to regulate and develop this critical resource. The multifaceted benefits that this techno-centric approach has yielded notwithstanding, there remained a critical lacuna in our framework for water management which systematically ostracized non-engineering disciplines. Take the case of Maharashtra where despite significant investments in large scale irrigation projects only 18% of the total area under cultivation is irrigated, amounting to less than half of the national average.
- ◆ Therefore, the need is to organize cross-disciplinary engagements within this sector whereby an integrated framework of management can be diligently pursued. In another example of our ancestors' penchant for engineering pursuit, excessive and unbridled ground water exploitation is now posing new challenges of food, health and water security for the country.
- ◆ The first step in our endeavor to establish a regime of sustainable water resources management has to begin with reforms in agriculture sector. This sector guzzles almost 90% of country's water resources and India's current agriculture water use efficiency is amongst the lowest in the world.
- ◆ Looking at the historical trajectory of development, the policy ecosystem has been developed in such a way that skewed incentives have become entrenched increasing demand for water guzzling crops of paddy and wheat in the agriculture sector. Therefore, for bringing greater rationality in agriculture sector's use of water resources, farmers need to shift from rice and wheat cultivation to growing nutri-cereals. The schemes of Poshan Abhiyan and Jowar Utsav are some of the initiatives of government in this direction.

- ◆ The second focus of action can be found in reducing fertilizers and pesticides use in the agriculture sector. The root of the problem can be traced back to India's green revolution and this, in turn, has now burgeoned into a national health problem. Chemical agriculture has reached its limit – yielding negative marginal returns in many areas due to reduced yield response to fertilizers and pesticides. This in corollary has also led to a dramatic rise in the cost of production, with disproportionate burden for poor and marginal farmers. Government, on the other hand, need to wean away from the typical knee-jerk reaction of doling out higher subsidies for chemical inputs, cash transfers, loan waivers, higher MSPs for wheat and rice. This will only reinforce the viscous cycle, reinstating the sorry state of affairs.
- ◆ Natural farming, as an alternative to chemical-laden farming, leverages the biological synergies amongst numerous plant and animal species allowing a) exchange process between plants, soil microbes and soil nutrients; b) making hitherto locked nutrients bio-available to plants; c) building of soil humus and soil fertility; and d) increase in soil moisture thereby resulting in enormous water savings. Some tried and tested methods includes: Non-Pesticide Managed Farming, Low Budget Natural Farming, Conservation Agriculture and Low External Input Sustainable Agriculture.
- ◆ The need for involving local farmers is much greater now for collaboratively managing the irrigation infrastructure, not least since it presents an opportunity to add 24mha of additional land under irrigated area at a cost of ? 1.5 lakhs per hectare against ? 3-5 lakhs per hectare – which is the present cost as per the present strategy of constructing more and more dams. Some additional benefits of pursuing Participatory Irrigation Management can be sourced by circumventing the pitfalls of land acquisition, major construction efforts, contraction-politician-official nexuses, cost escalation and time overruns.
- ◆ The second action point revolves around river basin governance

which incorporates scientific tenets of basin-wide water resources management. Learning some of the key concerns emerging out of our failure to manage water at a catchment scale, for example, excessive concretization in the name of development which stifles river insofar as its interaction with the broader catchment processes and ecology is concerned, India needs to adopt the canon of “healthier basins for healthier water resources” . Examples are galore, like the case of New York, wherein residents are going at length to uphold the integrity of broader catchment processes which in turn abet their Cities in sourcing clean water and ancillary ecosystem services.

- ◆ Moving forward, Indian water managers need to move beyond the three ‘hydro-schizophrenia’ gripping their minds. These are primarily between irrigation and drinking water, surface and ground water, and, water and wastewater. This has begot slipped back habitations, dried up rivers, depleting water quality and serious health implications for the public and ecosystem. To end this schizophrenic state of affairs, accordingly, water managers need to a) ensure source sustainability, b) integrate wastewater management, and c) promote conjunctive use of ground water and surface water.
- ◆ Lastly, the civil society also has an enormous role to play in nurturing the overall architecture of governance in the country. India’s water management strategy can recourse to PIM and participatory forms of ground water, including sustained partnerships between key public and private institutions, to accelerate sustainable and efficient water resources management practices. Navigating these transitions will require a cross-disciplinary approach whereby experts from social science, agriculture, ecological economics and other allied disciplines will have to work in partnership for developing and thereby implementing an integrated framework for managing country’s water resources.

# Water Talk-11

Speaker

Sant Balbir Singh Seechewal



Sant Balbir Singh is a renowned environmentalist who spearheaded the restoration and rejuvenation of the 110-miles long Kali Bein river, a tributary of the River Beas in Punjab and is an ardent anti-river pollution campaigner.

He is the man behind turning Seechewal village in Punjab's Jalandhar district into a model village for water conservation through community participation and public mobilization. Village Seechewal in the city of Sultanpur Lodhi, which is amongst several other villages developed in the rural belt of Punjab's Jalandhar district, has been picked up as a model village by the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation .

In 2017, Sant Balbir Singh was conferred the prestigious Padma Shri award for his role in cleaning of the 110-miles long Kali Bein river.



# Essence of the Talk Delivered

## by Sant Seechewal

- ◆ Sustainable management of rivers in India can be done with public participation only.
- ◆ The Kali Bein restoration model followed three key dimensions of river conservation. First, waste water from the nearby habitations were treated using aerobic and eco-friendly methods, and the treated water was reused via underground pipelines for irrigation purposes. Second, to arrest the rapid drawdown of ground water in the region, thick layers of silt and sediments were removed in order to promote water table recharge. This yielded multiple benefits -- the increased conveyance/inflow capacity of the river, speedy draining of excess water to prevent water logging and curbing desertification through increased seepage of river water under the subsoil. Third, plantation on the banks of the rivers for their beautification. This, not only enhanced the recreational value of water for the people living nearby, but also enhanced the ecological health of river owing to increased biological activities along these planted shores/corridors.
- ◆ While nature of problems vary depending on the context in which they originate, there are some common characteristics found across the country viz. non-cohesiveness amongst community members, bootless bureaucracy, politician-contractor nexus, &c.
- ◆ As water problems assume severity of daunting nature, we need to take inspiration from the vision of ancestors who had built water harvesting and conservation structures in bygone times, and in doing so need to heed ancestors' teachings while taking informed steps to collectively script an original narrative for sustainable and efficient management of water resources in India. Along with other Kar Sewak, the restoration work became an experience of blessedness, as volunteers had adopted Guru Nanak Dev Ji's philosophy of 'harmony with nature' as their manifesto. It transpired, accordingly, that only when the human efforts are liberated from the narrow self-interestedness, the work becomes a celebration and a holy worship.

## Water Talk-12

Speaker

Shri. Ayyappa Masagi



Ayyappa Masagi is the founder of Water Literacy Foundation in India. He is considered a "Water Warrior" for India and has played an instrumental role in transforming water management systems in over 13 states. He has helped create countless solutions to India's water scarcity problem and many communities, farms, and towns are now more water efficient through his help and guidance.

He has been nicknamed "Water Gandhi" by villagers on the Karnataka-Andhra Pradesh border

Under his able leadership, 2.5 lakh borewells have been recharged, 14 check dams have been constructed, 800 ponds were created and 35,000 hectares of dry land was converted to wet land. About 189 companies and several residential apartments have sought his help in solving the water problem.

Shri. Masagi has also been noted in the Limca Book of World records for having built over 700 artificial lakes to increase groundwater tables. Some of his published works include "Bhageeratha: War on Water Crisis, Converting Dry Land into Wet Land wherein he shares about his own life experiences with water issues and his successful work with his organizations.



# Essence of Talk delivered by Shri. Ayyappa Masagi

- ◆ The current water crisis is not inherent but is a result of unsustainable management of Water Resources.
- ◆ The abuse of groundwater sources, increased dependency on centralized systems and not saving and conserving rain water has led to this condition.
- ◆ For sustainable life, we have to manage our water resources in increasingly optimal and efficient ways.
- ◆ There is sufficient quantity of water available in the country. But we face water scarcity because we tend to extract more from the nature but not help the nature to re-coup it.
- ◆ “The Water Literacy Foundation” designs and implements systems that utilize rainwater as and when it falls, to replenish surface, sub-surface, sub-soil and underground water reserves. These low maintenance systems increase the water availability drastically while restoring the natural balance of ecosystems.
- ◆ Effectively using such small low- maintenance systems numerous individuals, communities and organizations have become self-sufficient in water and are often able to give excess water back to the ecosystem to rejuvenate the aquifer and small rivulets in their surroundings.
- ◆ Grey-water is an important source of water for water harvesting, it is important to differentiate between grey-water and sewage.
- ◆ The water left after washing, showering or even used in kitchen is not sewage but grey-water. 90% of water we flush away as sewage, in reality is grey-water. If it is separated from the sewage and is filtered and reused after proper filtration a lot of water can be saved. Oil, grease and most of the soap residues etc in Grey water can easily be cleared off. It can then be injected into a soak pit or an infiltration well, from where it percolates into the ground. Even if

there are some soap/oil element initially, the water is filtered by the soil and is cleared when it reaches the sub-surface and groundwater tables.

- ◆ Earthen Dams are one of the indigenous systems practiced to enhance water availability in rural areas. These are water management constructions that are built against streams and nalas to aggregate the surface run-off. An effective alternative to large dams, they are built out of an excavated soil with a supporting wall on the load bearing end.
- ◆ Stream water harvesting on the other hand, offers water security over prolonged periods by storing the surface runoff in the ground water table.
- ◆ In non-irrigational agricultural systems, Patta-Bunding, Compartment Bunding and the Trench & Pit System are practiced.
  - Patta-Bunding- In this system, the land is split into a number of compartments, around which 1.5 ft. burrows are dug, turning the whole land into an earthen tank. This implementation enables the soil to retain moisture from the scantiest rain upto 1.5 feet, inherently enriching the soil and hence the agricultural produce.
  - Compartment Bunding – The compartments vary in size from 1-4 acres, according to the slope of the land to quickly stop the surface runoff, thereby encouraging the natural leveling of the land, in addition to creation of containers to hold water, ensuring a more efficient runoff management. This system is ideal for the practice of horticulture as it drastically enhances the availability of water as moisture in the sub-soil region.
  - Trench and Pit System- This system uses an alternating row of pits and trenches to obstruct the runoff in large volumes and charge the subsoil and eventually the ground water table. The pits are dug in suitable sizes varying with the slope and materials available to fill the pits. If sand is locally available, the pits shall be filled with sand to enhance the percolation rate, with the sand acting as a filter. If sand is not available, coarse soil with additional materials from organic fibres is used to fill pits.

- ◆ Direct Borewell Recharging is an efficient and quick method to fill up the aquifers and raise the ground water table.
- ◆ Rainwater can be collected from roofs and made to flow through rainwater pipes to an online filter, where the suspended particles are removed. The filtered water is then collected in a sump and used by the households. If the sump is filled up to maximum capacity due to strong rains, the overflow can be connected to a recharge shaft so that the rainwater is used to recharge the groundwater. Through this process, it is ensured that no rainwater is wasted and every drop of water is used either in households or to recharge the exploited aquifers in urban areas.



# Our esteemed speakers delivering the “Water Talk”



Shri. U. P. Singh  
Secretary, DoWR, RD&GR, MoJS



Shri. G. Asok Kumar  
Mission Director, NWM



Shri. Shashi Sekhar  
Former Secretary, MoWR, RD&GR



Shri. Pushpendra Singh



Shri. Manu Bhatnagar



Shri. Sachin Oza



Shri. Alok Sikka



Dr. Nayan Sharma



Shri. Pradeep Gandhi



Shri. Anil Joshi



Dr. Tushaar Shah



Shri. Popat Rao Pawar



Shri. Umakant Umrao



Shri. Sonam Wangchuck



Shri. Heera Lal



Shri. Himanshu Kulkarni



Shri. Mihir Shah



Sant Balbir Singh Seehewal



Shri. Ayyappa Masagi

# Key Recommendations emerging from the Water Talk

Water Talks by our domain experts touched the intricate problem areas of ground water depletion which remains to be the main problem in the country. Some key recommendations include:

1. **Revival of Traditional Water Conservation Systems in the Villages:** The revival of ponds and wells through public participation and community engagement has shown positive results in many districts of the country. The implementation of this campaign under the leadership of district administrations helped in increasing groundwater levels and also making the villages self sufficient.
2. **Supply Side & Demand Side Management:** Though water has been traditionally managed through supply side interventions, including source protection and conservation measures such as construction of earthen bunds, percolation tanks, stone bunds, check dams, trenches, afforestation and protection of recharge zones, revival of water bodies etc., demand side intervention, like water budgeting, changing cropping pattern and efficient use of modern agricultural practices, holds even greater water saving potential for our country. Need is therefore to reconcile the supply and demand side approach alongside adoption of river basin approach for managing water resources.

Supply side:

- Extensive recharge to augment GW sources- It may be done by water harvesting through rejuvenation of water bodies, construction of percolation tanks, check dams, farm ponds.
- Mandatory protection of ground water recharge zones in the foot hills of Bhabhar, Terai (UP), Bazadas (Maharashtra), Aravalis and Bhuds (Haryana), flood plains, marshes and wetlands etc., aquifer recharge locations of the country.

- NAQUIM may provide required technical inputs in terms of site specific recharge areas & type of recharge interventions, aquifers capacity, rate of transmission etc.

#### Demand Side:

- Extensive education in water budgeting based management to manage sustainable extraction of ground water.
  - Address the energy-ground water nexus
  - Promotion of Drip / Sprinkler for efficient irrigation- Government is providing huge amount of subsidy for promoting drip/sprinkler system. Public Private Partnership (PPP) model may be implemented for better performance.
  - Change in cropping pattern suitable to the area- Adopt food diversity to include food like maize and millets which provides iron and micronutrients. Increased consumption of these crops will create market support and thus the increase in demand will lead to shift their cropping pattern, as envisaged under the Sahi Fasal campaign of NWM.
  - Institutionalize Water User Associations to embark in to community management of ground water. He suggested explore to create community level committee for each aquifer.
3. Rainwater Harvesting: Rainwater harvesting has been practiced since centuries in our country. Stepwells, or Baolis were used in the ancient times to collect the surplus rain water for use.
- The annual rainfall can be collected by installing 3 rain gauge stations at sub basin level. Different water conservation measures were taken like continuous contour trench (CCT), deep CCT, earthen bunds, percolation tanks, check dams, artificial aquifer blast and Plantation. This yielded considerable increase in water level, cropping intensity, fodder availability and milk production.
  - Increasing Pond Efficiency : A well designed pond can ensure availability of 30 to 40 litres of water out of 100 litres of rainfall

water for irrigation. A pond can be used to collect water from 1st order stream and pass the water to field. Therefore, there is a clear need to have a technical model for water conservation cum harvesting which is economically viable option for individual to invest. To make pond profitable the pond should be located at right place, should have right depth and size.

4. **Rejuvenation of Waste Water:** Wastewater from the nearby habitations can be treated using aerobic and eco-friendly methods, and the treated water can be reused via underground pipelines for irrigation purposes like in the case of Seechewal model.
5. **Creation of Ice- Stupas:** In areas of high altitudes, Ice-Stupas are developed as an innovative water conservation technique. Ice Stupa is a form of glacier grafting technique that creates artificial glaciers, used for storing winter water in the form of conical shaped ice heaps. The ice stupas are formed using glacial stream water carried down from higher ground through buried pipes, with the final section rising vertically. Due to the difference in height, pressure builds up and the water flows up and out of the pipe into sub-zero air temperatures. The water then freezes as it falls to gradually form an ice cone or stupa. In late spring the melted water is collected in large tanks and then fed onto planted land using a drip irrigation system.
6. **Public participation, Campaigning, Community Engagement:** A new mission statement be created which focuses on capacity building, partnerships, generating awareness, knowledge, skills and engages communities on ground. Further, improving community engagement would help improve overall resource management efficiency.
  - With the help of mass awareness tools like handbills, caps, T-shirts etc., a campaign can be created to reach masses at a larger scale. In any social campaign, community engagement is a must to bring about optimum results.



- Public events can be organised to promote the cause of water conservation.
- The Ministry can establish a Nation-wide Jal Jan Kendra in collaboration with good institutions which are connected with local villages, having science as basis and implementing the practical solutions. The Jal Jan Kendra should provide education on water and disseminate the information on various aspects of water and issues/ challenges/ solutions and best practices. The center should also create disseminate disasters related warning, and build awareness on the critical water scenario.

#### 7. Integrated Groundwater management:

- India's water management strategy can recourse to PIM and participatory forms of ground water, including sustained partnerships between key public and private institutions, to accelerate sustainable and efficient water resources management practices.
  - Community based participatory management has the capacity to change competition into participation. The legislation must complement participatory social norms. Participatory ground water management will comprise of the required scientific knowledge, community and community level engagement and will have the capacity to influence rural government systems like Panchayats.
- #### 8. Agriculture: Agriculture is the main reason behind the over exploitation of groundwater.
- Weaning away from Water intensive crops like wheat and paddy and encouraging farmers to use crops that use less water, but efficiency as envisaged in the "Sahi Fasal" campaign of the National Water Mission.
  - Natural farming, as an alternative to chemical-laden farming, leverages the biological synergies amongst numerous plant and animal species allowing

- a) exchange process between plants, soil microbes and soil nutrients;
- b) making hitherto locked nutrients bio-available to plants;
- c) building of soil humus and soil fertility; and
- d) increase in soil moisture thereby resulting in enormous water savings.

Some tried and tested methods includes: Non-Pesticide Managed Farming, Low Budget Natural Farming, Conservation Agriculture and Low External Input Sustainable Agriculture.

- There is now a greater need for involving local farmers for collaboratively managing the irrigation infrastructure.



# National Water Mission

The National Action Plan on Climate Change (NAPCC) launched by the Government of India identified the approach to be adopted to meet the challenges of impact of climate change through institutionalization of eight national missions which inter-alia includes a 'National Water Mission'. Accordingly, the Government of India established National Water Mission as one of the eight National Missions under the National Action Plan on Climate Change. The Union Cabinet approved (on 6th April, 2011) the comprehensive Mission Document for National Water Mission (NWM).

The main objective of NWM is “conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management”.

NWM has identified five goals as under:

- (i) Comprehensive water data base in public domain and assessment of the impact of climate change on water resource,
- (ii) Promotion of citizen and state actions for water conservation, augmentation and preservation,
- (iii) Focused attention to vulnerable areas including over-exploited areas,
- (iv) Increasing water use efficiency by 20%,
- (v) Promotion of basin level integrated water resources management.

Strategies for achieving the goals have been identified which has led to integrated planning for sustainable development with active participation of the stakeholders. In pursuance to the approval accorded by the Union Cabinet to the National Water Mission, a Mission Directorate was established in the Ministry of Water Resources, River Development & Ganga Rejuvenation.

- Involve and encourage corporate sector / industries to take up, support and promote water conservation, augmentation and preservation within the industry and as part of corporate social responsibility.

Strategies under Goal 3 - Focused attention to vulnerable areas including over-exploited areas.

- Expeditious implementation of Water Resources projects particularly the multipurpose projects with carry over storages benefitting drought prone and rain deficit areas.
- Promotion of traditional system of water conservation.
- Physical sustainability of groundwater resources.
- Intensive programme for groundwater recharge in over-exploited, critical and semi-critical areas.
- Conservation and preservation of wetland.
- Intensive programme for addressing the quality aspects of drinking water particularly in rural areas.
- Promotion of water purification and desalination.
- Systematic approach for coping with floods.

Strategies under Goal 4 - Increasing water use efficiency by 20%.

- Research in the area of increasing water use efficiency.
- Incentivize recycling of water including waste water.
- Development of Eco-friendly sanitation system.
- Improve efficiency of urban water supply system.
- Promotion of water efficient techniques and technologies.
- Pilot projects for improvement in water use efficiency in collaboration with States.
- Promote water regulatory authorities for ensuring equitable water distribution.
- Promote mandatory water audit for drinking water purposes.

Strategies identified under each goal

Strategies under Goal 1 - Comprehensive water data base in public domain and assessment of the impact of climate change on water resources.

- Review and establishment of network for collection of additional necessary data.
- Development of Water Resources Information System.
- Development / implementation of modern technology for measurement of various data.
- Developing inventory of wetland.
- Research & studies on all aspects related to impact of climate change on water resources including quality aspects of water resources with active collaboration of all research organizations working in the area of climate change.
- Reassessment of basin wise water situation.
- Projection of the impact of climate change on water resources.

Strategies under Goal 2 - Promotion of citizen and state actions for water conservation, augmentation and preservation.

- Empowerment and involvement of Panchayati Raj Institutions, Urban Local Bodies, Water Users' Associations and primary stakeholders in management of water resources with focus on water conservation, augmentation and preservation.
- Promote Participatory Irrigation Management (PIM).
- Sensitization of elected representatives of over-exploited areas on dimensions of the problems and to orient investment under MNREGP towards water conservation.
- Provide incentives for water neutral and water positive technologies in industry.
- Encourage participation of NGOs in various activities related to water resources management, particularly in planning, capacity building and mass awareness.

- Adequate provision for operation & maintenance of water resources projects.



# Recent Initiatives of National Water Mission

- “**National Water Mission Awards**” were instituted to encourage and incentivize organisations and individuals to conserve and manage water. The **first NWM awards** were given on 25.09.2019.
- “**Water-Talk**” - A seminar series to promote dialogue and information sharing among participants of water related topics was started on 22nd March 2019 and are being held on third Fridays of every month since then. Its aim is to stimulate awareness, build capacities of stakeholders and encourage people to become active participants by saving water.
- “**Sahi-Fasal**” – a campaign to nudge the farmers to grow crops which are less water intensive and uses it efficiently; have nutritional quality and are remunerative to the farmers was launched on 14th November 2019 in Amritsar with workshop attended by 850 farmers. This was followed by a technical workshop in New Delhi on 26th and 27th November, 2019 where Mr Walter Jehne a renowned micro-biologist and water expert gave the key note address. The 3rd workshop at Aurangabad on 13th January 2020 was attended by 1200 farmers. The 4th workshop was held at Kurukshetra on 14th February 2020.
- A profile Video on the goals, strategies and activities of the National Water Mission was made and released on You Tube.
- Jingles (‘Kal-ki-suraksha-keliye’ & ‘Ye-shahar-shahar’) on water conservation were composed and aired in FM Radio channels.
- Issued circular requesting Ministries & Departments to install “aerators” in office toilets & Rain Water Harvesting Systems at their office premises.
- State and UT Governments are supported to formulate a State Specific Action Plan (SSAP) on water at basin level for sustainable development & management of its water resources linking it with their State Action Plan for climate change.
- NWM has taken an initiative to popularize the concept of state

water budgeting on lines similar to that of financial budgeting. NWM has developed a common template for water budgeting for preparation of State Specific Action Plan for water sector.

- For developing standards in respect of improving water use efficiency in domestic appliances, NWM, in collaboration with Bureau of Indian Standard (BIS), is working on efficiency labelling standards for house-hold appliances like washing machines, sanitary wares & fittings.
- Has awarded 26 Base Line studies covering 6 States for improving water use efficiency in irrigation sector, to NERILWALAM, Assam; WALMTARI, Hyderabad; WALMI, Aurangabad.
- Bureau of Water Use Efficiency on the lines of Bureau of Energy Use Efficiency is being planned.
- Taken up scoping studies through TERI by undertaking comprehensive water audit/ benchmarking in two industrial sectors i.e. thermal power plants & textile industries for enhancing industrial water use efficiency in India.
- A workshop on improving Water Use Efficiency in Industry was held on 5th March 2020.
- NWM is to start, from March 2020, a new campaign “Catch the rain” to promote Rain Water Harvesting Structures all over the country with an aim to get the country “rain-ready” before the onset on the monsoon. The main focus would be to create space and store as much rain water as possible. The main focus will be on harvesting water in open areas, particularly in institutions of defence establishments, ordinance factories, PSUs, Airports, railways etc and universities and big education institutions which have large land areas with them. Roof top rain water harvesting structures, clearing of encroachments of water bodies and their channels, se-silting of existing water bodies, creation of new water harvesting structures etc based on soil and atmospheric conditions will also encouraged. Rain Centers with dedicated staff and mobile numbers to give technical support will be opened in all districts. A workshop on various technologies and methods of RWH was held on 13th March, 2020.





## Sahi Fasal

'Sahi Fasal' campaign was launched by National Water Mission on 14.11.2019 to nudge farmers in the water stressed areas to grow crops which are not water intensive, but use water very efficiently; and are economically remunerative; are healthy and nutritious; suited to the agro-climatic-hydro characteristics of the area; and are environmentally friendly.

Creating awareness among farmers on appropriate crops, micro-irrigation, soil moisture conservation etc; weaning them away from water intensive crops like paddy, sugarcane etc to crops like corn, maize etc which require less water; assisting policy makers to frame policies that make effective pricing of inputs (water and electricity); improve procurement and market for these alternate crops; create appropriate storage them etc ultimately leading to increase in the income of farmers are the key elements of "Sahi Fasal" .

Under Sahi Fasal, series of workshops are being organized in the water stressed areas of the country. Farmers Workshops have been held at Amritsar (14.11.2019), Aurangabad (13.1.2020), Kurukshetra (14.2.2020) and a workshop of agriculture experts at New Delhi (26,27.11.2019)

In India, 85-89% of water usage is for agricultural purposes and about 5% usage is for drinking and domestic purposes. Hence, even a small percentage saving of water in agricultural usage will have a significant impact in water availability for drinking and domestic purposes.

नहीं है जल, तो नहीं फसल | कम जल ले, वो "सही सफल"



National Water Mission's campaign "Catch The Rain" is to nudge the states and stake-holders to create appropriate Rain Water Harvesting Structures (RWHS) suitable to the climatic conditions and sub-soil strata, by first week of June itself, ie before the onset of monsoon.

Under this campaign, drives to make check dams, water harvesting pits, rooftop RWHS etc; removal of encroachments and de-silting of tanks to increase their storage capacity; removal of obstructions in the channels which bring water to them from the catchment areas etc; repairs to step-wells and using defunct bore-wells and unused wells to put water back to aquifers etc are to be taken up with active participation of the people.

To facilitate these activities, " Rain Centers" are to be opened in each district, at least for 4 months from May 1, in Collectorates/Municipality/GP offices. During this period, these Rain Centres will have a dedicated mobile phone number and will be manned by an engineer or a person well trained in RWHS. This centre act as a technical guidance centre to all in the district as to how to catch the rain, as it falls, where it falls.

Efforts should be made so that in the next two months all buildings in the district should have rooftop RWHS and that maximum quantity of rain water falling in any compound should be impounded within the compound itself. The basic aim should be that No or only limited will water to flow out of the compound. This will help in improving soil moisture. In urban areas it will reduce water gushing out to roads, damaging them and will also prevent urban flooding. Under the "Catch The Rain" initiative, all water bodies in the districts are to be enumerated, (checked with revenue records) and encroachments to be removed.





सत्यमेव जयते



**Ministry of Jal Shakti,  
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Government of India**

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