

**3 Days IISD National Workshop**  
10<sup>th</sup>-12<sup>th</sup> September 2020



# DRINKING WATER SUPPLY AND MANAGEMENT FOR **LEH**

**Indian Institute of Sustainable Development (IISD), New Delhi**

The Workshop organized by IISD through Microsoft Teams virtual platform at IISD HQ New Delhi and also at the same time, live from Hotel Grand Dragon, Leh.



**Ladakh Ecological Development  
Group (LEDeG)**

Our Local Partner



**Carbon Minus India (CMI)**

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## Acknowledgements

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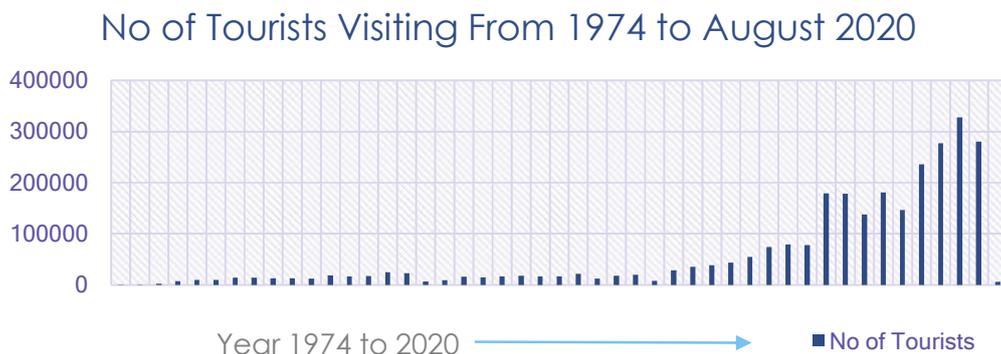
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# ABOUT THE WORKSHOP

IISD Leh Water Supply Management Workshop was planned and designed considering the key issues, which are of utmost importance and mark the need of the hour. IISD in consultation with LEDeG identified 3 sub themes for this 3 Days event, which was held at Leh, where local stakeholders and concerned Policy Makers, Government Officials, Public Health Engineering Personals, Researchers, Academicians, Chemists, the all, could join the debates, discussions and knowledge delivery presentations in a very focused and meaningful manner. In view of COVID-19, the workshop was conducted on a joint platform, where on one hand this workshop was live at Hotel Grand Dragon and another in the virtual webinar format through “Microsoft Teams”. The workshop was held simultaneously on both these platforms as a national event, where many participants also joined from major metro cities of the country. Workshop administration and management was jointly organized at Leh from the hotel and at the same time, from IISD, HQ at New Delhi, with respect to relevant present challenges and identifying probable best possible solutions to these challenges.

## 1. Groundwater Management and Regulations

About 80% of the demand for drinking water is fulfilled from ground water sources by the different tube wells scattered across towns. Fresh water supply demand is increasing each year especially in summers due to the large number of tourists and migrant workers visiting the area. Since the region was opened for tourism 1975 a gradual increase in the influx of tourists has been observed and gradually the shift from agriculture to tourism has been observed especially after 2011. Leh town hosts to 90 % of the commercial establishment which ranges from star hotels to small scale restaurants, due to which dependence on ground water for the daily requirements is seen and the number of bore wells increasing year by year and thus resulting in serious depletion in ground water level.



This has put the region under huge water stress especially in the peak summer seasons, thus resulting in a huge demand between supply and demand resulting in the more and more dependence on bore wells, causing serious depletion of ground water level. As per data from PHED around 611 private bore wells are present in Leh town itself of which is of 9.15 Sq. Km, which accounts for 66.7 bore wells per Sq. Km.

At present due to the non-implementation of Water resources and regulatory act in the newly formed UT Ladakh is causing hindrance in keeping a check in the ground water usage in the town. Due to climate change precipitation in the form of both snow and rain is decreasing yearly affecting the recharge of ground water. With the rise in tourism and the ongoing constructions to accommodate the increase flux of tourists, more and more water has to be supplied yearly. If drawing of water is unchecked, then the Leh town is likely to experience water stress. Also currently there is no concrete or even reasonable data on how much of ground water is being extracted daily. People in Ibex Colony, zone no 10 have become very conscious that water shall not be used for the purpose like car or cloth washing, when they do not have water to drink as depicted in the plate fixed to the hand pump, in the photograph placed on the right side.



**Public Stand Post at Ibex Colony, Zone 10, the people themselves are taking initiatives to self-regulate the Ground Water for their drinking purpose**



**Mr Chewang Norphel, Padmashree awardee and fondly known as the Ice Man of Ladakh**

Source: <https://www.thebetterindia.com/14672/man-creates-artificial-glaciers-chewang-norphel-ladakh/>

In conversation with Mr Chewang Norphel, a Padmashree awardee, who is also famously known as the ice man of Ladakh, suggested that the water on the other side of Khardong la, which is not being used should be diverted in the valley through a series of tunnel. Therefore, it is important to regulate the amount of water, which is being drawn from ground in the valley, to make Leh town water sufficient. Mr Norphel has already created around eight artificial glaciers, which cater to the irrigation needs of farmers in various hamlets, and he is now busy making three more glaciers near Stakmo village.

According to Mr Norphel and other experts in Leh, the artificial glaciers are much to the satisfaction of farmers. The artificial glaciers are also seen as a solution for other problems: helping to recharge groundwater and rejuvenate springs; enabling farmers to harvest two crops per year; developing pastures for rearing; and reducing water-sharing disputes among farmers.

## 2. Water Pricing and Tariff Structure

At present there is no structure for water pricing or any regulations on how to deal with the defaulters. The people are being charged on flat rate basis with the amount being Rs 2415 yearly. There is no check on if the bill is being paid by the general public by cutting water connections. As per data obtained from PHED department there is a total of 4832 functional house hold connections are working in Leh town at present. From which only 245 connections have paid their annual fees, generating total revenue of Rs 585053/- in the financial year 2019-20. Therefore, there is a revenue loss of Rs 1,10,77605/- per year; is being faced by the PHED department, as it is calculated from the nonpayment of bills to unregistered connections. Having system of flat rate also leads to wastage of water by the general population by irrigating kitchen gardens or by washing cars etc. inspections are held on a regular basis by the PHED department in collaboration with the municipal department and they are also accompanied by police during these inspections. This has led to a reduction in wastage of water but not been able to put a complete lid on it. In the household survey done by the IISD- Leh team regarding the water audit of Leh town, it was observed by the team that the people are willing to pay against usage of water, and it was suggested that installation of water meters.

## 3. Water Quality Analysis

Apart from supplying adequate required water for drinking and daily use, the department also has to always bear in mind that its quality is maintained all the time to safeguard the health of the community. The 1st step is to supply safe potable water to promote good health, as the water quality is directly related to community health and improvement of drinking water quality is followed by improvement in community health. Factors agricultural practices like usage of agro chemicals, industrialization, use of soakage pits etc effect the quality of water at large. Sickness caused by poor water quality especially in infants mostly diarrhea and other water borne diseases. The recorded no of diarrhea in the district hospital, Leh is given in graph below.



At present the check on water quality is being kept by the District Water Testing Laboratory, Leh, which comes under the Public Health Engineering Department. A small team lead by Mr Nurboo (AE), a Chemist, Biologist and a Data Entry Operator, takes water samples from sources of Leh district. The division is facing serious shortage of manpower to facing severe instrument shortage.

With a limited training to staffs, the present PHED laboratory certainly requires regular calibration of the instruments. In addition, right now, there is no laboratory, engaged in monitoring the fecal contaminations, which is being frequently reported in the areas, particularly, where, there are already a large number of tourist establishments.

Program Agenda details out about topics discussed; distinguished Speakers delivered their professional analysis based information, facts, their view points and opinions showing directions towards the solutions to these problems.



Collection of water sample from T Trench, an Open Reservoir located at Gompa Village, Zone 4. In above photograph Dr Enoch Spalbar (IISD-Leh) in Collecting Water Sample, Mr Anub Paljor, LEDeG Overlooking the Sampling Procedure.

### Snapshot from the workshop Chief Guest Shri UP Singh, IAS delivering Inaugral Address

Dr Srikanta K Panigrahi, Director General IISD, Convener

Shri UP Singh (IAS), Secretary, MoWR, Delivering Inaugral Address

Sukhneet Kaur, Research Associate IISD, Moderator

Participants at Leh

Three days workshop  
**"Drinking Water Supply and Management for Leh Town, UT-Ladakh"**  
 11<sup>th</sup> September, 2020  
 Hotel Grand Dragon, Leh

Organised by,



Indian Institute Of Sustainable  
Development (IISD) New Delhi

In Association with



Carbon Minus  
India (CMI)



Ladakh Ecological Development  
Group (LEDeG), Our Local Partner

# PROGRAM AGENDA

| Day 1 : Theme : Managing and Regulating Ground Water for Drinking Water Supply |          |  |  |
|--|----------|--|--|
| Date: 10th Sept 2020   |          | Time: 9:30 AM to 5:00 PM   |  |
| Session No   | Time     | Topic  | Speaker  |
|  | 0930 Hrs | Registration, Tea, Meeting of the Participants   |  |
| 0  | 1000 Hrs | Introduction of the Workshop and About the Event   | <b>Ms Sukhneet,</b><br>MC of the Event<br>Research Associate, IISD   |
|  | 1010 Hrs | Inaugural Message for the Workshop by Chief Guest(s) of Day  | <b>Dr G C Pati</b><br>Chairman, CGWB<br>Ministry of Jal Shakti<br><br><b>Dr Ishey Namgyal</b><br>President Municipal<br>Committee of Leh |
|  | 1020 Hrs | Brief Welcome Address for the Day  | <b>Dr Srikanta K. Panigrahi</b><br>Director General, IISD  |
| 1  | 1025 Hrs | <b><i>Ground Water Occurrence, Distribution and Exploration in Leh district of Ladakh (UT)</i></b> <ul style="list-style-type: none"> <li>• Introduction - Ground Water: Occurrence, Distribution and Movement - The Science</li> <li>• General Hydrogeology, Ground Water Exploration (National Aquifer Mapping) in Leh District</li> </ul> | <b>Shri Mohinder Lal Angurala</b><br>Scientist-'D'<br>Central Ground Water Board (CGWB), NWHR<br>Jal Ayog Bhawan<br>Ban Talab, Jammu     |
|  | 1130 Hrs | <b>Tea / Coffee Break</b>  |  |
|  | 1145 Hrs | Water Well Construction, Design, Development and Testing, Exploration, Potential Assessment: General Process and also with Special Reference to Leh  |  |
|  | 1300 Hrs | <b>Lunch Break</b>   |  |
| 2  | 1400 Hrs | <i>Model Bill to regulate the Ground Water Development and Ground Water Resource Estimation as per GEC 2015 in context to Leh</i>  | <b>Shri Vidya Nand Negi</b><br>Scientist-'D'<br>Central Ground Water Board (CGWB),NWHR   |
|  | 1500 Hrs | <b>Tea / Coffee Break</b>  |  |
| 3  | 1515 Hrs | <b><i>The implication of 2005 Model Bill on Ground Water Resources: A Legal Review</i></b> <ul style="list-style-type: none"> <li>• Model Bill Regulate and Control of Development and Management of Ground Water: Legal Perspective</li> </ul>  | <b>Shri Pawan Kumar</b><br>Research Fellow,<br>SRC-CEL, IISD   |
|  | 1625 Hrs | Closing Note for Day 1   | <b>Shri Eshey Tondup</b><br>Executive Director, LEDeG  |

| Day 2 : Theme : Water Pricing and Tariff Structure |          |  |  |
|--|----------|--|--|
| Date: 11th Sept 2020                               |          | Time: 9:30 AM to 5:00 PM   |  |
| Session no   | Time     | Topic  | Speaker  |
|  | 0930 Hrs | Registration, Tea, Meeting of the Participants   |  |
| 0  | 1000 Hrs | Introduction of the Day's Theme  | Ms Sukhneet,<br>MC of the Event<br>Research Associate, IISD  |
|  | 1000 Hrs | <b>Inaugural Address by the Chief Guest for the Workshop (All 3 days inclusive)</b>  | Shri U P Singh, IAS<br>Secretary, Ministry of<br>Water Resources<br>(MoWR)<br>Ministry of Jal Shakti |
|  | 1005Hrs  | Opening Message by the Guest(s)of Honor of the Day   | Shri A.K Sahu, IAS<br>Commissioner Secretary<br>of UT-Ladakh   |
|  | 1010Hrs  | Brief Welcome Address for the Day  | Dr Srikanta K.<br>Panigrahi<br>Director General, IISD  |
| 1  | 1015 Hrs | Water Pricing and Tariff Structure<br>General Principles : An Economic Tool for<br>Water Management and Conservation - Some<br>Experience from Present Leh Water Audit<br>Project  | Dr Srikanta K.<br>Panigrahi<br>Director General, IISD  |
|  | 1115Hrs  | <b>Tea / Coffee Break</b>  |  |
| 2  | 1130Hrs  | <b><i>Water Pricing and Tariff Structure,<br/>Willingness to Pay, Experiences from Delhi<br/>and Leh</i></b>   | Dr Dipender Kapur<br>Team Lead/Senior<br>Domain Expert, NIUA   |
|  | 1230Hrs  | Questions and Discussion   |  |
|  | 1300 Hrs | <b>Lunch Break</b>   |  |
| 3  | 1400 Hrs | Intricacies of Water Pricing & Non-Revenue<br>Water  | Prof Vibhore Bakshi<br>Assistant Professor<br>SPA Bhopal   |
| 4  | 1500 Hrs | <b><i>Water Pricing in Urban India: Experiences<br/>from the professional ground</i></b> <ul style="list-style-type: none"> <li>• Water Pricing Issues in Urban India;</li> <li>• Determination of a right consumption based Tariff Structure against 100% installation of Water Meters in every household?</li> </ul> | Dr Rajeshwar Rao, IAS<br>Additional Secretary<br>NITI Aayog,<br>Urban Development                    |
|  | 1545 Hrs | <b>Tea / Coffee Break</b>  |  |
| 5  | 1600 Hrs | Water Pricing & Tariff Structure : Experience<br>Sharing - Case Study Stories from Few Indian<br>Cities and Abroad   | Shri Pawan Kumar<br>Research Fellow,<br>WRC & CEL, IISD  |
|  | 1625 Hrs | Closing Note for Day 2   | Dr Ishey Namgyal<br>President Municipal<br>Committee of Leh  |

| Day 3 : Theme : Drinking Water Quality Analysis |          |  |   |
|---|----------|--|---|
| Date: 12th Sept 2020                            |          | Time: 9:30 AM to 5:00 PM   |   |
| Session no                                      | Time     | Topic  | Speaker   |
|   | 0930 Hrs | Registration, Tea, Meeting of the Participants   |   |
|   | 1000 Hrs | Introduction of the Workshop and About the Event   | <b>Ms Sukhneet</b> ,<br>MC of the Event<br>Research Associate, IISD   |
| 0   | 1005Hrs  | Opening Message by Guest of the Day  | <b>Shri Jigmet Takpa, IFS</b><br>Jt. Secretary, MOEF&CC   |
|   | 1010 Hrs | Brief Welcome Address for the Day  | <b>Shri Eshey Tondup</b><br>Executive Director,<br>LEDeG  |
| 1   | 1015 Hrs | <b>Overview of Drinking Water Quality</b><br>Introduction, Water Sampling, About Physical, Chemical and Biological Parameters and General Analysis Procedures for Water Quality Assessment : Likely Adverse Impact to Human Health | <b>Dr Rashmi Sanghi</b><br>Senior Research Fellow,<br>Head, Water Resources Center (WRC), IISD                                      |
|   | 1130 Hrs | <b>Tea / Coffee Break</b>  |   |
| 2   | 1145 Hrs | Setting up an NABL Accredited Lab, - Toxicology : Physical, Chemical and Biological Analysis of Water Quality - Real Experience Sharing  | <b>Dr Rakesh Kumar</b><br>Former Principal Scientist, CSIR-IITR, Lucknow<br>NABL Accreditation Assessor for Water Lab Certification |
|   | 1300 Hrs | <b>Lunch Break</b>   |   |
|   | 1400 Hrs | Setting up an NABL Accredited Lab & NABL Certification Process Details - Experience Sharing  |   |
|   | 1455 Hrs | Questions and Discussion   |   |
|   | 1500 Hrs | <b>Tea / Coffee Break</b>  |   |
| 3   | 1515 Hrs | <b>Ground Water Quality , Standards and CGWB's Experience in Leh District Ground Water Quality Data 2019</b>   | <b>Dr Sudhir K Srivastava</b><br>Senior Scientist<br>Central Ground Water Board (CGWB) HQ, Faridabad                                |
| 4   | 1600 Hrs | <b>Water Quality Monitoring and Surveillance</b><br>Jal Jeevan Mission (JJM), Water Quality Standards, Pre and Post Analysis Management, Practical Experiences from PHE Jammu and Leh  | <b>Er Waris Ahmad Sheikh</b><br>Executive Engineer,<br>PHE Jammu  |
|   | 1645 Hrs | Closing Note for Day 3   | <b>Shri Urgain Nurboo</b><br>Head PHE Water Quality Testing Lab, Leh  |

# WHO IS WHO?

## The Team



**Dr Srikanta K Panigrahi**  
Director General,  
Indian Institute Of  
Sustainable  
Development (IISD)

**Dr. Srikanta K. Panigrahi**, is a Leading Indian Sustainability Thought Leader, who is also a Statesman, Policy Maker, Technocrat, Strategist, Environmental City Planner, Sustainability Practitioner, Gandhian Ecologist, Editor, Author and Poet. He is the Director General, Indian Institute of Sustainable Development (IISD), New Delhi and Member to Prime Minister on National Strategic Knowledge Mission on Climate Change, along with other Steering/Technical Expert Committees, Working Groups, Task Forces of Different Ministries, including Technology Information Forecasting Assessment Council (TIFAC) of Government of India and UNFCCC. He has advised the apex policy making body of the Government, Planning Commission; where he was instrumental in the formulation and implementation of Tenth and Eleven Five Year Plan in Environment & Forest Sector. He has worked for Government of India, United Nations Environment Program (UNEP) and the World Bank. Dr Panigrahi has Delivered Key Note Addresses in 27 international universities (other than India), of the Globe.

He has a B.Tech Degree in Civil Engineering with 3 Masters, One from IIT Delhi, Master Of Environmental Planning from School Of Planning & Architecture (SPA), New Delhi, MBA from Technical University Of Dresden (TUD) Germany, and a PhD in Public Policy with a Specialization in Science Policy. He is also a Visiting Professor to teach Business Strategy and Business Sustainability at Department of Management Studies (DMS), IIT Delhi.

Being a Civil Engineer and City Planner, Dr Panigrahi has vast experience in the field Water Resources Engineering, City water supply and waste water collection system designing, execution and treatment, water quantity and quality assessment, regulation and management, Water Pricing, Willingness to pay studies, Water Efficient Cities designing and Execution of Water and Sanitation Program (WASH) of UNICEF and the World Bank as well as National Water Mission, Jal Jeevan Mission (JJM) and other Initiatives of Ministry Of Jal Shakti, Government Of India.

Dr Panigrahi is known as "**Chief Architect of Indian Carbon Market**"; who was instrumental to initiate Kyoto in India, the entire UNFCCC CoP Process, Climate Change Negotiations and DNA formation which he enabled and it is only because of his personal pursuance and Leadership initiatives; India was first starter of CDM, among developing World and could emerge as Global CDM Leader.

Dr Panigrahi is also awarded **National Science Popularization Award** from hon'able Prime Minister of India in 2004-05; for his extraordinary contribution and commitment to popularize Science among common mass, who is working in the areas of Environment Protection, Natural Resources Management (NRM), Energy Conservation, Climate Change & Renewable Energy and Sustainable Development for last more than 30 years.



**Ms Sukhneet Kaur**  
Research Associate  
IISD, Moderator

**Sukhneet** is a Research Associate with IISD and the Moderator of this Workshop. She is an Architect-Planner with a knack for research in the field of urban and regional studies and is fiercely active to contribute towards constant growth, innovation, formulation, production and dissemination of knowledge and structural processes that are relevant in her field of study. She has a keen interest in exploring the philosophy, history and geography of people, places, practices, objects and associated socio-cultural, ecological, economic and political elements.

She is an alumna of School of Planning and Architecture (SPA), Bhopal and has led Live projects during her course period there as a core lead. In addition to this, she also possesses a short industry experience in the architectural front at an eminent international firm called KGD-A Katera Design Partner in Bangalore, Karnataka.

She brings her expertise in IISD's Smart City Program, Sustainable Habitats Planning and Zero Carbon Cities Initiatives.



**Shri Eshey Tondup**  
Executive Director,  
LEDeG

**Shri Eshey Tondup** has a Bachelor in Education, from Kashmir University and Masters in Political Science from renowned Banaras Hindu University (BHU). He has worked with the Education Department in the State Government for more than 22 years. In addition, he has also served as the Principal at the historic Lamdon School for 22 years, which is one of the most prestigious schools in Leh. Shri Eshay Tondup is currently heading Ladakh Ecological Development Group (LEDeG) as the Executive Director. Shri Tondup is a Distinguished Citizen of Leh, who is committed for the Sustainable Development in Ladakh Valley.

LEDeG's mission is to demonstrate ecologically sound development models and to advocate regionally appropriate development policies to ensure Sustainability. For last close to three decades, LEDeG has been working towards bettering the lives and livelihoods of the rural communities living in the remote villages of Ladakh and also trying to influence development policies at the regional level.



**Ms Phunsok Angmo**  
Team Lead, Water &  
Sanitation Team,  
LEDeG

**Ms Phunsok Angmo** is currently working as WatSan Coordinator Of LEDeG, primarily in the field of Solid Waste Management, where She is leading the team in spreading the Community based Awareness for the importance of segregation at Source, improving the Solid Waste Collection, Transportation and Processing System and imparting training to Safai Karamcharis. along with the Municipality Committee of Leh and Kargil. She has worked in CENSFOOD, which is a Leh based NGO working in the field of education, employment generation and disaster relief. She also worked in Lenovo Group Limited in Sales and Marketing for 3 years at Bangalore, followed by Kolkata and New Delhi.

She completed her Post Graduate Diploma in Management from Indian Institute of Management Calcutta and did her Bachelor in Engineering in Information Technology from Delhi Technical University (DTU) (formerly known as Delhi College of engineering), New Delhi.



**Shri Anub T. Paljor**  
Member, Water &  
Sanitation Team,  
LEDeG

**Shri Anub Tsetan Paljor** has completed his Master of Science (M Sc), Specializing Climate Change and Sustainability Studies from the prestigious Tata Institute of Social Sciences (TISS), Mumbai. He is currently working with the Water & Sanitation Team (WatSan) at Ladakh Ecological Development Group (LEDeG) at Leh Of UT-Ladakh.

Anub is also nominated by Executive Director, LEDeG, Shri Eshey Tondup to represent LEDeG, as a Supporting Local Partner to IISD initiatives, Meetings and particularly in the Organizing Committee of IISD's Ladakh International Conference and Policy Dialogue: *Redefining the Development for a Cold Desert: Ladakh, India*, which is planned in post-COVID period, during mid / end of 2021. He is very active in pushing LEDeG's Water and Sanitation drive, in Livable Leh project, supported by the European Union (EU) and BORDA.

## Chief guest of the workshop



**Shri U. P. Singh, IAS**  
Secretary, MoWR  
Ministry Of Water  
Resources,  
Govt Of India

**Shri U.P. Singh, IAS** is a 1985 batch Indian Administrative Service Officer of Odisha Cadre. He did his B.Tech in Mechanical Engineering from IIT, Kanpur. He joined the Ministry of Water Resources & River Development and Ganga Rejuvenation in 2016 as Additional Secretary and also held the post of Mission Director, National Water Mission (NWM). Later he assumed the charge of Director General, National Mission for Cleaning Ganga (NMCG) in October 2016. Prior to joining the Ministry of Water Resources, RD& GR, he worked as Additional Secretary in the Ministry of Petroleum and Natural Gas. He has the experience of working in different sectors like Water Resources, Finance, Steel, Transport, etc.

Presently he is Secretary in the Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti, since 2017. He is deeply involved in Public Policy, Planning and Management of Water Resources in India. He oversees the implementation of PMKSY Projects, Inter-Linking of Rivers and two World Bank funded projects. These projects envisage revolutionizing water resources management in the country.

## Honorary guests of the workshop



**Dr G. C. Pati**  
Chairman, CGWB,  
Ministry of Jal Shakti,  
Govt of India

**Dr G. C. Pati** is now the Chairman of the Central Ground Water Board (CGWB), Ministry of Jal Shakti. He has a very decorated career as a technical expert, policy maker, researcher and academician in the field of Ground Water, Water Resources Management, Water Quality, Environment, Water Chemistry etc. He has substantial contribution in mathematical modelling of groundwater system, ground water survey, exploration, resource evaluation, scientific source finding in Technology Mission for Drinking Water. Dr Pati has been successful in providing Drinking Water (GW) sources to more than 300 no source problematic rural habitations in Odisha.

He holds an M. Sc. in Geology from Utkal University, Bhubaneswar and P.G. Diploma (in E.E. and Management of Water Resources) from H. University of Jerusalem, Israel. Belonging to 1984 UPSC batch, he was inducted as a Scientist in CGWB. Dr Pati has worked for 32 years in Ground Water Sector in various grades of Scientist, Course Director, Regional Director, Director (Administration) in addition to being the Chairman presently. He worked as a specialist in Remote Sensing and GIS application to Ground Water Studies and Geo-statistics.



**Shri A.K. Sahu, IAS**  
Commissioner  
Secretary,  
UT-Ladakh

**Shri Ajeet Kumar Sahu, IAS** is the Commissioner Secretary at UT Administration of Ladakh, since July 2020. He has been handling the Departments in the genre of Public Health Engineering, Irrigation & Flood Control, Housing & Urban Development, Public Works, School Education, Social & Tribal Welfare, and General Administration of Ladakh.

Before this he was working as Commissioner Secretary, Jal Shakti Department for the state of Jammu and Kashmir and Secretary to Government, School Education Department prior to that. He has worked tirelessly in the field of policy execution and Policy Formulation since he assumed office as an IAS officer of J&K Cedar in 2003.

He is a development enthusiast and an alumnus of the prestigious Institute of Development Studies, Brighton, East Sussex, UK.



**Er Pradeep K. Sharma**  
Superintending  
Engineer PHED,  
Ladakh

**Er Pradeep K. Sharma**, is the Superintending Engineer of Public Health Engineering Department, UT-Ladakh now. He has great Professional Experience and rich credentials to his credit; in addition to other related Departments at UT-Ladakh as well as in the former state of Jammu & Kashmir.

He is a proud Civil Engineering Alumnus from Maulana Azad College of Technology (MACT), now known as Maulana Azad National Institute of Technology (MANIT), Bhopal.

Under his Leadership, Leh Public Health Engineering Department is going to achieve greater heights, addressing the needs and aspirations of the People in this newly formed UT-Ladakh, including establishing four water quality analysis laboratories in Leh District, introduction of an appropriate Water Pricing mechanism, in Drinking Water Supply and Sanitation in a 24x7 System.



**Dr Ishey Namgyal**  
President Municipal  
Committee of Leh

**Dr Ishey Namgyal** is the President of Municipal Committee, Leh. He won from Tukcha ward, during the Municipal Committee elections in 2018, was elevated to the post of President of MCL. He was earlier engaged with the Animal Husbandry Department.

Post Retirement now he is very much alive in public life. He also took keen interest in this Leh Water Supply and Management Workshop, where he joined as an invited Guest and leading Policy Maker the of City Administration. Being a Public Representative, he is very active in contributing Plan, Policies and Programs at City level to meet the hope and aspiration of the people of Leh.



**Shri Jigmet Takpa,**  
IFS  
Jt. Secretary,  
MOEF&CC

**Shri Jigmet Takpa, IFS** is a civil servant in the Government of India with over 30 years of experience in Biodiversity Conservation, Sustainable Natural Resource Management, Landscapes Restoration, Climate Change Mitigation and Adaptation.

Currently working as, the Joint Secretary in the Ministry of Environment, Forests and Climate Change, the National Focal Point (NFP) of UNCCD, and also served as the GEF Operational Focal Point. Many of his projects have also culminated in policy formulation and launch of flagship national projects in the areas of biodiversity conservation, livelihood improvement, rural energy access.

## Esteemed Speakers of the workshop



**Dr K. Rajeshwar Rao**  
IAS, Additional  
Secretary, NITI Aayog

**Dr. K. Rajeswara Rao, IAS** holds a Doctorate Degree in Social Sciences, M.Phil, M.A. in Sociology, Degree in Basic Sciences and PG in Journalism. He belongs to the Indian Administrative Service (Tripura Cadre) 1988 batch, presently posted in NITI Aayog as Additional Secretary and is managing Urbanization (Urban Development) & Urban Poverty Alleviation, Skill Development, Labour & Employment, UTs etc.

During the long span of 32 years of administrative experience, dealt with Six Ministries of Government of India in two different states. He has a long association with prestigious organisations like ADB assisted National Urban Health Mission, World Bank/GIZ assisted Environmental projects, DFID assisted APUSP, world's largest Urban Reform Project etc. He has addressed several international seminars and conferences on his areas of expertise.



**Dr Rashmi Sanghi**  
Head of Division,  
Water Resources  
Center (WRC), IISD

**Dr Rashmi Sanghi** is a Senior Research Fellow and heading the Water Resources Centre (WRC) at Indian Institute of Sustainable Development (IISD) New Delhi. She is also the additional Project Investigator to Leh's IISD Water Audit Project, i.e going on now. In addition, she is leading several IISD initiatives in Water Resources Management and Water Sustainability.

She is a doctorate in organic chemistry from Allahabad University. Till 2018 she worked at the Indian Institute of Technology Kanpur as a Research Scientist and Punjab Engineering College Chandigarh. She has been a visiting scientist/faculty at the Rutgers University USA 1996 and LNMIIT Jaipur 2010.

She is the recipient of CHEMRAWN VII- 2012 IUPAC international Prize for Atmospheric and Green Chemistry award (IUPAC AWARD). She has travelled worldwide for various academic activities and has over 85 international journal publications, two patents and six books to her credit with a high h index of 39 ([Google Scholar Tracker](#)). Her latest book is about the Ganga river "Our National River Ganga: Lifeline of Millions", published by Springer.



**Dr Rakesh Kumar**  
Former Principal  
Scientist, CSIR-IITR,  
Lucknow

**Dr. Rakesh Kumar** is the retired Principal Scientist of **Indian Institute of Toxicology Research, (CSIR), Lucknow**, who is a well-known Analytical Chemist, Associate Professor, ACSIR and NABL Lead and Technical Assessor. He has done Doctorate on Biologically Important uranium compound, from Lucknow in 1983 and now he has the vast experience of 38 years in various capacities as Quality Control and Management personnel. To his credit he has more than 30 research papers, 06 book chapters and participation in more than 20 conferences, trainings and meetings at national and International levels. He has contributed in several sponsored consultancies, R&D projects of CSIR and non CSIR, since he ventured into this career.

He has delivered several invited talks on Analytical field to scientific organizations, degree colleges, and universities of India.



**Dr Sudhir Shrivastav**  
Senior ScientistCGWB  
HQ Faridabad

**Dr Sudhir Kumar Srivastava** is M Sc in Physical Chemistry and Ph D in Chemistry in 1991. He has worked as a CSIR JRF. He Joined Central Ground Water Board in 1987. During his association with Central Ground Water Board, he gained wide Research experience in the field of Chemical analysis, methods related problems, chemical analysis of Water for its quality, pollution, environmental impact assessment, suitability of water for drinking, agricultural, domestic and industrial use.

He was instrumental in setting up of Regional Chemical Labs of CGWB at various places. He is resource person for NABL accreditation of Water Quality Labs in CGWB. He has got more than 120 papers published / presented in various National & International Journals/ Seminars.



**Er Waris Ahmad Sheikh**  
Assistant Executive  
EngineerPHED,  
UT-J&K

**Er Waris Ahmad Sheikh** is currently working with Central Water Testing Laboratory, Srinagar as Assistant Executive Engineer, Public Health Engineering Department, UT - Jammu & Kashmir. He has expertise in Water Quality Monitoring & Surveillance, under JJM. He is currently managing around 50 Water Testing Laboratories in Kashmir Division. He supervises the Conduction of Tests for Chemicals used for Drinking Water Treatment in the region.

He has worked tirelessly in supervising the Capacity Building of All Stakeholders in Water Quality Testing. He conducts Workshops, Awareness & Education Programmes among local communities as well.

He is an alumnus of the Regional Engineering College (NIT), Srinagar where he completed his B.E. in Civil Engineering.



**Shri ML Angurala**  
Scientist-'D', Central  
Ground Water Board

**Shri ML Angurala** is a Scientist with a long association with Central Ground Water Board, North Western Himalayan Region. His work focuses specifically on Ground Water Exploration and Ground Water Regime Monitoring.

After completing his Post-graduation studies from the University of Jammu in Geology, he travelled extensively and facilitated his research initially in the hard rock and coastal areas of Odisha state as an Assistant Hydro geologist, South Eastern Region.

He has also worked on numerous projects under the same umbrella them in Jammu and Kashmir, Punjab, Haryana and Chandigarh.



**Prof Om P Mathur**  
Senior Fellow and  
Head, ISS New Delhi  
Former Director,  
NIUA

**Prof Om Prakash Mathur** is a Senior Fellow and Head, Urban Studies at the Institute of Social Sciences, New Delhi and has served as a Distinguished Professor of Urban Economics at the National Institute of Urban Affairs (NIUA), New Delhi, from 2011-2013. He has held the IDFC Chair in Urban Economics and Finance at the National Institute of Public Finance and Policy (NIPFP), New Delhi for over 15 years.

He held the position of Director, National Institute of Urban Affairs (NIUA), New Delhi from 1984-1992. He has served as a Consultant to many respected organisations around the globe namely, United Nations, the World Bank, Asian Development Bank (ADB), UNCHS, UNDP, UNICEF, GIZ, UNESCAP, Bangkok and Asian Productivity Organisation (APO), Tokyo.

Shri Mathur was also a Member of the Prime Minister's National Review Committee on JNNURM in addition to being a Member of the finance Commission of three states.



**Shri Vidya Nand Negi**  
Scientist-'D', Central  
Ground Water Board

**Shri Vidya Nand Negi** has 19 Years of decorated work experience in Central Ground Water Board with a specialization in ground water exploration, Ground Water Regime Monitoring in Himachal Pradesh and Jammu & Kashmir.

He is an Alumni of the Department of Geology, Punjab University, Chandigarh. He has worked on various projects like National Aquifer mapping in Himachal Pradesh, Ground Water Modeling of Una valley in Himachal Pradesh, Ground Water Resource Estimation of Himachal Pradesh as well as Jammu & Kashmir to name a few.

Shri Negi has also worked as the Head of Office in Northern Himalayan Region, Dharamshala, Himachal Pradesh.



**Dr Dipender Kapur**  
Team Lead/Senior  
Domain Expert, NIUA

**Dr Dipender Kapur** is a senior Development and WASH expert and is currently working with the Sanitation Capacity Building Platform of National Institute of Urban Affairs (NIUA) in New Delhi.

NIUA was established in 1976, and was tasked to bridge the gap between research and practice on issues related to urbanization urban policy and planning, municipal finance and governance, land economics, transit oriented development, urban livelihoods, environment & climate change and smart cities.

He has previously worked with WaterAid, CARE, Oxfam, WSSCC, SPWD and AKRSP. He is Principal Trustee of India WASH Forum, a national advocacy coalition and a member Trustee of Environment Law Research Society and part of a citizen's initiative on Water and Sanitation in Delhi.



**Shri Pawan Kumar**  
Research Fellow, IISD

**Shri Pawan Kumar** is a Research Fellow at IISD. He has a cross-cutting multi-sectoral experience of Integrated Water Resources Management, NRM, Air Act, Water Act and Environment Protection Act, 1986. He holds a Master of Laws (LL.M) Degree from the Prestigious South Asian University and is currently working with two important units of IISD i.e Water Resources Centre (WRC) and also Centre for Environmental Law.

In addition, he is deeply involved with our recently constituted Research and Knowledge Support Centre for Sustainable Development in Ladakh of IISD, where he also taking keen interest in Ladakh International Conference to be organized in mid-2021. He has a lot of national and international publications to his credit, and is also working on two books at present.



**Prof Vibhore Bakshi**  
Assistant Professor  
SPA, Bhopal

**Prof Vibhore Bakshi** is currently working with School of Planning and Architecture, Bhopal. He is proactive in organizing research seminars, conference and other knowledge exchange activities. He has publications in the field of Water supply, Urban Mobility etc. He has also published a book titled “*Assessing Accessibility for Metro stations of Faridabad*”.

Recently here in this workshop, he presented his research on “*Planning Imperatives for Non-Revenue Water in India*”, at SDC, Bangkok and also shared his research on “*Spatial-Temporal dynamics of Peri-Urban Development*” at Pusan University, Busan, South Korea, with a special reference to Leh town.

He is engaged as a faculty coordinator on behalf of SPA, Bhopal on several Live projects, which reinforces his strong academic background and a robust professional experience of research and consultancy.



Shri A.K Sahu, IAS, Commissioner Secretary of UT-Ladakh; Dr Ishey Namgyal, President Municipal Committee of Leh; and Shri Eshey Tondup, Executive Director, LEDeG; with other participants during the course of the workshop



Shri A.K Sahu, IAS, Commissioner Secretary of UT-Ladakh; Guest of Honor delivering an Inaugural Note for the Day-2 of the workshop, while Dr Srikanta K. Panigrahi, DG-IISD is seen Online at Microsoft Teams Virtual Webinar Platform Screen

## ABOUT IISD



**Making India Sustainable**

Indian Institute of Sustainable Development (IISD), New Delhi is registered as a leading Indian National Independent Public Policy Think Tank and Research Institution at New Delhi, with an Objective of working towards Social, environmental and business sustainability; involving People, Planet and Profit to ensure sustainable development of mankind, through scientific innovations, engaging multiple stake holders. Although IISD is working with this objective and mandate since July 1997, officially it got registered since 3<sup>rd</sup> July 2007 and working with 51 Focus Areas now. IISD works for the weaker sections of the society, for the empowerment of the common man to ensure social and environmental justice and overall improvement of their lives and living standards of common citizens of the country and strives to put India into a sustainable path that is inclusive and equitable in overall political, economic, social, cultural and environmental direction, which helps in poverty alleviation through livelihood generation, works to manage Our natural resources such as water, forests and minerals; in a most efficient and sustainable manner, ensures water and energy security to sustain the present day high economic growth, engages climate change mitigation and adaptation and promote cleaner technology in order to sustain overall development of society. Moreover, IISD works with the governments, bi-lateral and multilateral agencies, industries, academia, premier scientific research institutes, private and public sector organizations, multinationals, credible national laboratories and the other civil society organizations, different communities and indigenous people at grass-root level, using research & social, scientific and engineering consultancy as tools to attain its objectives.

In addition, IISD is right now engaged in developing appropriate strategies and action plan to implement 17 United Nation (UN) Sustainable Development Goals (SDGs). IISD's 51 Focus Areas includes a Special Centre absolutely, to ensure Sustainable Development in UT-Ladakh; an ancient civilization, with rich cultural and natural heritage, which is also a highly environmentally sensitive cold desert ecosystem Ladakh Valley in the lap of Himalayas.

### **IISD Research and Knowledge Support Centre for Sustainable Development in Ladakh**

Ladakh is having an unique ecosystem, with its wonderful people, culture and heritage and it's the right time the region should get prior importance, especially after the creation of new Union Territory of India in October, 2019, for it's all round development, which should be sustainable and IISD being a premier national institute is keen to see that the region receives its best in the country for which it has created this Centre, known as the IISD Research and Knowledge Support Centre for Sustainable Development in Ladakh.



Source:<http://www.bharatexpedition.com/search/lab/el/Incredible%20India>

In this Centre, IISD is keen to undertake Research Projects and Studies, in few Challenging Sectors of-Water & Natural Resources Management (NRM), Tourism, Agriculture, Solar & Renewable Energy, Industry, Mining and Education, in the Region for next 5 Years, with respect to Carrying Capacity Of the Valley, adverse Impact and Vulnerability of Climate Change, Sensitive Environment, Forests and Wildlife Protection Issues, Frequent Changing Fragile Land Use Pattern in a cold Desert Eco-system and Preservation of rich Ladakh's Natural and Cultural Heritage and ancient value system.

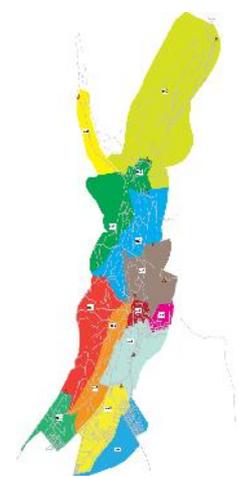
IISD Research and Knowledge Support Centre for Sustainable Development in Ladakh is proud to organize this 3 Days Leh Water Supply Management Workshop at Hotel Grand Dragon at Leh *as well as* on Webinar Format, with Carbon Minus India (CMI) and Ladakh Ecological Development Group (LEDeG) - as our Local Partner.

## IISD's Leh Water Audit Project

IISD is conducting a comprehensive water audit and surveys across the 12 zones in Leh Town's PHE water supply system: to evaluate water use (supply, demand, loss), water quality and identify opportunities for better management practices.

This is one of the most challenging projects in this difficult time of COVID-19, where surveying and sampling are posed as the most difficult tasks, amongst social distancing and sanitizing requirements.

We have surveyed huge numbers of households to conduct door to door interviews, including few of community leader (Goba)s and several distinguished citizens of the town, in a period of three months, in the highest town of the country Leh. The town neither has its own functional water quality analysis laboratory, nor right infrastructure to conduct flow meter based field surveys for undertaking quantitative assessment of water supply and it's loss and leakage, while water scarcity adds up to the present pressuring need of this hour.



12 PHED Zones, Leh

**Dr Srikanta K. Panigrahi**, Director General, IISD and **Dr Rashmi Sanghi**, Head, Water Resource Centre (WRC), IISD (*may refer their Profiles above*) lead this Project, supported by a **IISD-Leh Local Water Audit Team**, consists of following Members, as listed below:



**Dr Enoch Splabar**, is leading *IISD-Leh Local Water Audit Team* as the Team Leader and Project Investigator. He has worked as a Senior Research Fellow, at ICAR, Central Arid Zone Institute, Regional Research Station-Leh under a DST funded project for 3 years. He has authored 15 research papers related to Soil, Organic farming, Nutrient management in plants and conservation of traditional knowledge. He received his Doctoral Degree in Soil Science & Agricultural Chemistry (2017) from SKUAST, Jammu.



**Ms Namgyal Angmo** is a Research Associate with Team-IISD, who has conducted Leh household and community leader (Goba)'s survey. She is a Graduate in English Literature from prestigious Miranda House, University of Delhi and also has taught in Ashoka University as a Graduate Assistant and has also done a Post Graduate Diploma in Liberal Studies from Ashoka.



**Mr Padma Stanzin** is a Research Associate of Team-IISD, who is engaged in conducting household surveys in the Project, is a Graduate in Agricultural Sciences from SKUAST Jammu. He has professional interests in Agronomy, Organic farming, Composting and Water harvesting conservation.

## ABOUT LEDeG



The **Ladakh Ecological Development Group (LEDeG)** envisions promoting Ecological and Sustainable Development that harmonizes with and builds on the local Traditions & Culture in Ladakh. It is a grassroots organization that has been working in the region since 1983 towards the sustainable development of Ladakh, while preserving its essence.

LEDeG's mission is to demonstrate ecologically sound development models and to advocate regionally appropriate development policies to ensure Sustainability. For last close to three decades, LEDeG has been working towards bettering the lives and livelihoods of the rural communities living in the remote villages of Ladakh and also trying to influence development policies at the regional level. Currently LEDeG is working on an Urban Project called "Livable Leh", which focuses on achieving UN Sustainable Development Goals (SDGs) i.e. SDG 6 on Clean Water and Sanitation and 11- on Sustainable Cities and Communities; funded by the EU and BORDA.

*The Livable Leh Project envisages making Leh a more Livable, Inclusive and Resilient Himalayan City. The programs are designed to help build capacities of the local government which will further better and effective management of the region and its resources. The project also aims to bring resilience and inclusiveness in the town that will help raise the resident's quality of life in this era of climate change.*

Because of Similarity in the Objectivity of the Both Organizations, IISD Research and Knowledge Support Centre for Sustainable Development in Ladakh has joined hand with LEDeG as its esteemed Local Partner in its Mission of ensuring Sustainability to the People and the Land of UT-Ladakh.



Honorable Member of Parliament, UT Ladakh, Shri Jamyang Tsering Namgyal and Chief Executive Councilor, LAHDC, Shri Gyal P Wangyal are inaugurating LEDeG's Leh Vision Document 2030, with all religious heads of Leh Town

## ABOUT CMI



**Carbon Minus India (CMI)** is an Indian Institute of Sustainable Development (IISD) initiative and a Credible Indian Think Tank; established at New Delhi, in the larger interest of man-kind for the survival of the earth from *Global Warming* and other adverse impact of *Climate Change*. CMI is engaged to evolve a strategic framework for India *as well as* the planet, in identifying low carbon growth opportunities and guide / facilitate a series of planned and scaled-up programme, which would support to the on-going dialogues for establishing a climate friendly development path, which also strives for:

- Articulate a cost-effective strategy for further lowering the carbon intensity of the economy at the macro and sectoral levels that is beneficial for national growth objectives, by identifying synergies, barriers and potential trade-offs and financial needs to address these blockades
- Identify opportunities for and facilitate leveraging financial resources, including external finance, such as Carbon Finance (CF), to support of a low carbon growth strategy, *as well as* explore the possible need for new financing instruments; and
- Raise national awareness and facilitate informed consensus on India's efforts to address global climate change.



Carbon Minus India (CMI), has Verified and Certified Airport Carbon Accreditation (ACA) Level-2, to 4 International Indian Airports, Varanasi, Kolkata, Bhubaneswar and Thiruvananthapuram of Airport Authority of India (AAI) first-time, in January, 2020, Winning an International Bidding of Ministry of Civil Aviation, Government of India



Hon'ble Member of Parliament from New Delhi, Ms Meenakshi Lekhi is inaugurating IISD-CMI's recent Advanced Executive Training Program on Climate Change Mitigation, Carbon Foot printing, Sustainability Reporting and Renewable Energy at India International Centre (IIC), New Delhi

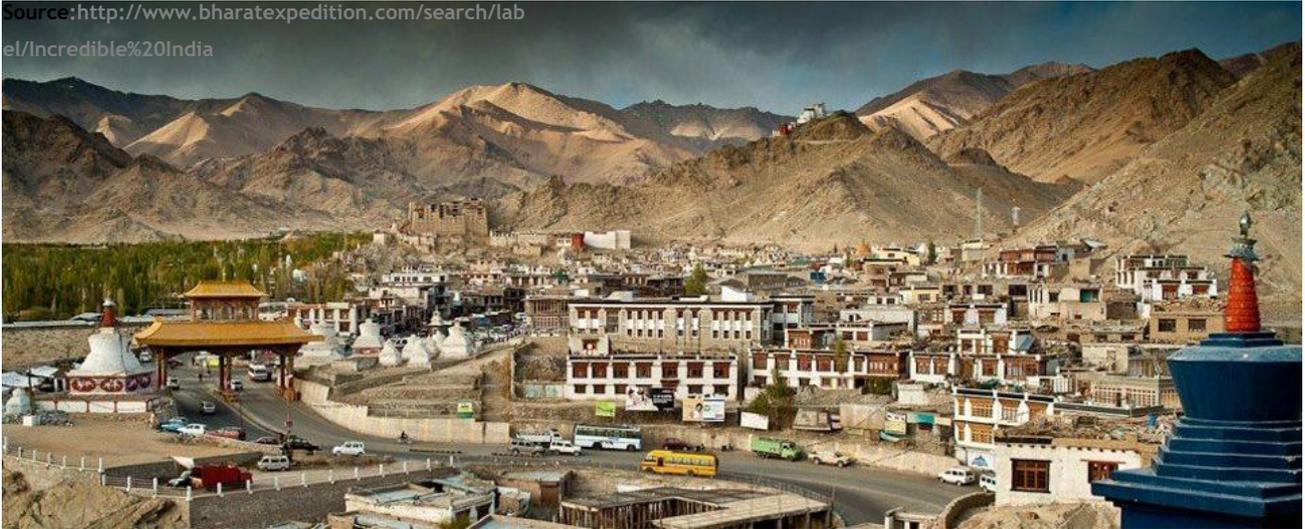


Shri A. K. Jain, IAS, then Adviser Energy and International Cooperation, NITI Aayog, now Secretary to Government Of India to Ministry Of Mines, received by IISD-CMI Core Team to Join One Of their Key Workshop as the Chief Guest



Dr Ajay Mathur, then Director General, BEE and now Director General, The Energy and Resource Institute (TERI) was Chief Guest in One of the IISD-CMI-AECTPs to distribute the Certificates to Esteemed Participants

Source: <http://www.bharatexpedition.com/search/lab-el/Incredible%20India>



Source: <http://henrycesari.com/north-expeditions/>

## Upcoming International Conference and Policy Dialogue

# Redefining Development for a Cold Desert: Ladakh, India

Drawing a Vibrant Policy, Regulation and Governance Framework to ensure Sustainable Development in few Challenging Sectors of - Water & Natural Resources Management (NRM), Tourism, Agriculture, Solar & Renewable Energy, Industry, Mining and Education, in the Region for next 5 Years, with respect to adverse impact and vulnerability of Climate Change, Sensitive Environment, Forests and Wildlife Protection Issues, Frequent Changing Fragile Land Use Pattern in a cold Desert Eco-system and Preservation of rich Ladakh Cultural Heritage and ancient value system

Date: Post COVID, Mid / End of 2021 at Leh and New Delhi

Venue:- Leh at UT-Ladakh and Vigyan Bhawan, New Delhi

Inauguration: - Hon'ble Lieutenant Governor at Leh and Hon'ble Prime Minister at New Delhi

Organized by: Indian Institute of Sustainable Development (IISD), New Delhi, Government of Union Territory of Ladakh, Ministry of Home Affairs (MoHA), With Carbon Minus India (CMI) and The Ladakh Ecological Development Group (LEDeG) as Local Supporting Partner

Supported By: NITI Aayog, Ministry Of Environment, Forests & Climate Change (MoEF&CC), Ministry Of New and Renewable Energy (MNRE), Ministry Of Water Resources (MoWR) / Jal Shakti, Ministry Of Tourism (MoT), Ministry Of Agriculture and Farmers Welfare (MoAFW), Ministry Of Micro, Small and Medium Enterprises (MSME), Ministry Of Education (MOE), Ministry Of Tribal Affairs, Ministry Of Youth Affairs and Sports (MoYAS), Ministry Of Culture (MoC), Ministry Of Housing and Urban Affairs (MoHUA), Ministry Of Rural Development (MoRD), Ministry Of Railways (MoR), Ministry Of Road Transport and Highways (MoRTH), Ministry Of Petroleum & Natural Gas (MOP&NG), Ministry Of Mines (MoM), Ministry Of Commerce and Industry (MoC&I), Startup India and Invest India etc; under Government Of India and UNDP, UNEP, European Union(EU), The World Bank and GIZ.

**Policy Makers, Thought Leaders, Thinkers, Technocrats, Researchers, Academicians, Authors, Nature Lovers, Domain Experts - Those who are interested, along with a Photo and Brief Bio - Please Contact us at - [sustainableinstitute@gmail.com](mailto:sustainableinstitute@gmail.com), [dg@iisdindia.in](mailto:dg@iisdindia.in) and [info@iisdindia.in](mailto:info@iisdindia.in) and to know further more - Please visit - [www.iisdindia.in/ladakh](http://www.iisdindia.in/ladakh)**

**NB:** All the individuals, Ministries, Partners and Venue are in proposal stage only; subject to finalization, with respect to extension of our invitation, followed by their subsequent acceptance and confirmation.

**10th to 12th September  
2020**

**Hotel Grand Dragon**  
Our Hospitality Partner and Venue

# Drinking Water Supply and Management for Leh Town

Convenor

**Dr Srikanta K. Panigrahi**  
Director General, IISD

Moderator

**Ms Sukhneet Kaur**  
Research Associate, IISD

10th September 2020, Day 1: **Managing and Regulating Groundwater for Drinking Water Supply**

11th September 2020, Day 2: **Water Pricing and Tariff Structure**

12th September 2020, Day 3: **Drinking Water Quality Analysis**

Brought to you by,



Indian Institute Of  
Sustainable  
Development  
(IISD) New Delhi

In Association with



Carbon Minus India (CMI)



Ladakh Ecological  
Development Group  
(LEDeG)  
Our Local Partner