IWMI International Water Management Institute

TATA TRUSTS

IWMI-TATA Water Policy Program

IWMI-Tata Partners' Meet 2024 Workshop Report

Growth with Resilience for *Viksit Bharat* 2047

Conversations around Water, Energy and Livelihood Security

| 18-20 Sep 2024 | National Dairy Development Board, Anand, India |

Oorna Raut | Shilp Verma | Sneha S.B. (*Eds.*)

International Water Management Institute

Event Partners

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Acknowledgement

This report has been made possible through the efforts of many. We would like to thank the organising team for their coordination and support, the session custodians and rapporteurs for their thoughtful documentation, and all participants for the clarity and depth they brought to discussions.

Citation

Raut, O.; Verma, S.; Sneha, S. B. (Eds.). 2025. *Growth with resilience for Viksit Bharat 2047: conversations around water, energy and livelihood security*. Workshop Report of the IWMI-Tata Partners' Meet 2024, Anand, India, 18-20 September 2024. Colombo, Sri Lanka: International Water Management Institute (IWMI). 58p. doi: https://doi.org/10.5337/2025.244

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IWMI-Tata Water Policy Program

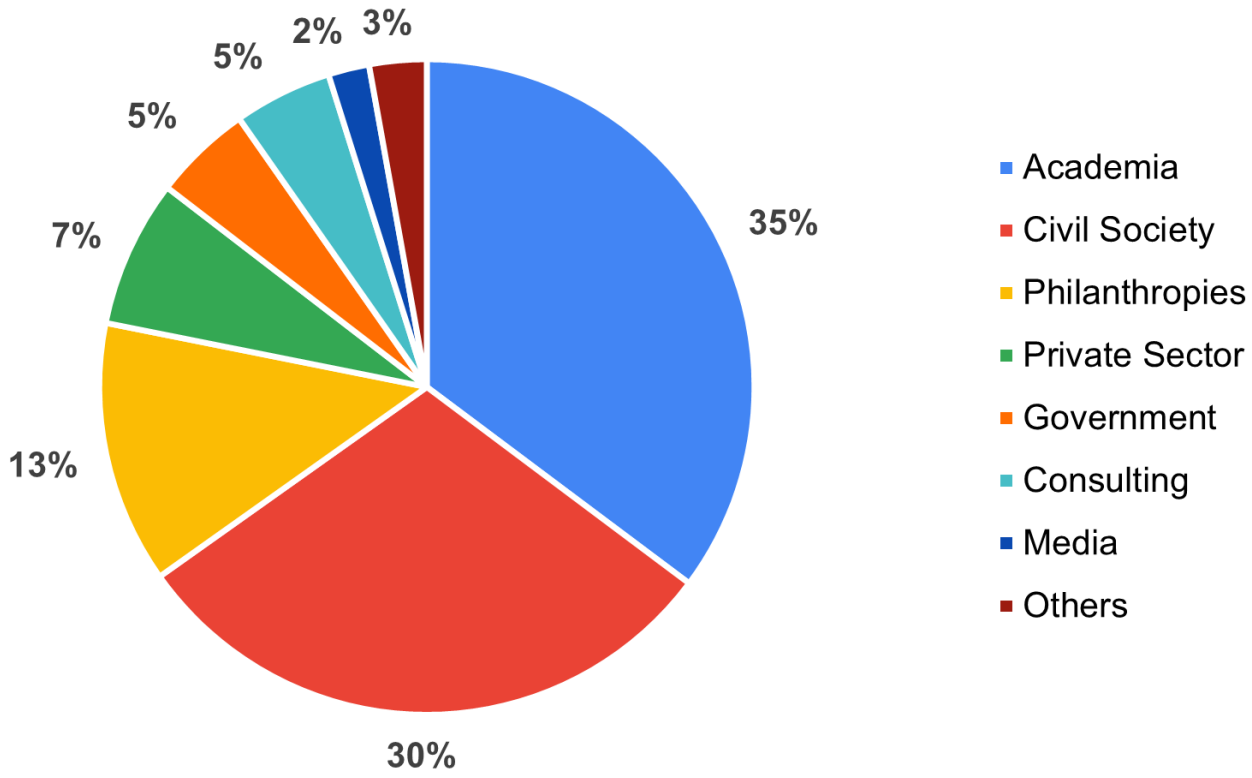
Session Partners

About IWMI-Tata Program

Established in late-2000 as a co-equal partnership between the International Water Management Institute (IWMI), Colombo and Sir Ratan Rata Trust (SRTT), Mumbai, the IWMI-Tata Water Policy Research Program (ITP) brings together the scientific expertise and international experience of IWMI with strong field presence, action orientation, and growing investments in NRM-based livelihoods of the Tata Trusts' ecosystem. Over the past two decades, ITP has become a recognised brand in India's water-agriculture-energy-environment-livelihood domain. ITP has established itself as a strong knowledge partner and resource for the Tata Trusts as well as a thought leader, advisor and influencer for key development and impact investments. ITP's work has directly influenced development investments worth 1000-times the investment that IWMI and Tata Trusts have put into the program. In its current phase, ITP's mandate includes evidence-based field research, technical advisory and seeding innovative field experiments, training and capacity building – all aimed at informing, influencing and inspiring program design and policy formulation.

The ITP Partners' Meet 2024

The ITP Partners' Meet is a flagship event to share ongoing work and receive inputs, feedback and identify promising opportunities for collaborative policy research, action research and field experimentation.
The Partners' Meet 2024 was a three-day event in Anand, Gujarat, that convened over 300 national and international scientists, young researchers, NGO leaders, practitioners, policy makers, philanthropists, and media professionals to discuss key issues in India's water, energy, climate and livelihoods space (see figure below). The event comprised of high-level plenaries and 18 technical sessions across four thematic tracks. Each technical session included research-based presentations followed by moderated panel discussion with leading experts aimed at informing, inspiring, and influencing field programs and policies. Participants also had the option to undertake field trips to two of IWMI-Tata Program's action research pilots in *Dhundi* and *SaatOrdi*. This report presents glimpses from and a summary of the discussions and deliberations during the three-day event.



Composition of participants at the Partners' Meet 2024.

Event Team


Deepa M.P.M.


Dharmesh Makwana


Jagdish Yadav


Kishan Parmar


Lamnganbi Mutum


Manya Dixit


Milan Mehta


Nikunj Usadadia


Niraj Trivedi


Philip Kuriachen


Punjan Patel


Rahul Thakor


Rahul Rathod


Reghu Poozhiyil


Ronak Suthar


Shivam Parmar


Sneha S.B.


Shilp Verma


Suchiradipta Bhattacharjee


Tushaar Shah


Vidya Mandave


Vishal Gohel


Vivek Gupta

Welcome and Registration

DAY-01
Wednesday
18th September

09.30 to 11.00	11.30 to 13.00
P-1 Opening Plenary Converting Science into Policy Action | Shilp Verma |	**P-2** Water and Philanthropy Water Security in *Viksit Bharat* 2047 | Manisha Shah | | IWMI-Tata and Synergos |

14.30 to 16.00	16.30 to 18.00
T1-S1 Energy Transition in the Gangetic Plains **| Avinash Kishore |**	**T1-S2** Energizing Bihar's Agriculture **| Tushaar Shah |**
T2-S1 From Dung to Dollars **| Niraj Trivedi |**	**T2-S2** Climate-sensitive Dairy Development **| Sneha S.B. |**
T3-S1 Blue Boundaries **| Vidya Mandave |**	**T3-S2** Rejuvenating Public Irrigation Systems **| Alka Palrecha | Gyan P. Rai |**
Field Trip #1 Solar Pump Irrigators' Cooperative **| Rahul Rathod |**	**T4-S1A** Climate Resilience in Asia's Water Towers **| Rajesh Thadani | Arun Pandhi |**

Tea Break 11.00 to 11.30 || 16.00 to 16.30

Lunch Break 13.00 to 14.30

Conference Dinner | Venue: Madhubhan Resorts 19.30 to 21.30

P-1 Opening Plenary

Converting Science into Policy Action

Date: 18th September 2024 | **Venue: T.K. Patel Auditorium** | **Time: 09:30 – 11:00**

Custodian: Shilp Verma | **Chair: Rachael McDonnell** | **Rapporteur: Suchiradipta B.**

The IWMI-Tata Water Policy Program – a unique collaboration between an international research-for-development organization, IWMI and India's oldest and largest philanthropic foundation, Tata Trusts – is delighted to gather partners and key stakeholders once again in Anand for the IWMI-Tata Partners' Meet.

Over the years, ITP Partners' Meet has become an important milestone in India's water, energy, agriculture, climate and rural livelihoods space as a curator of bold, new practical ideas that deserve to be field tested. The program's collaborative research and action research portfolio has been driven by the needs of implementing, grassroots organizations and backed by strong field evidence and insights.

Following a CoViD-induced hiatus, the Program re-grouped in 2022 with a team of young researchers. In its current *avatar*, ITP has been working closely with Tata Trusts' Associate Organizations (AOs). The design and focus of each technical session closely aligns with the goals, objectives and field programs of key ITP partners. We hope you'll actively engage with the diverse gathering of scholars, practitioners, thought leaders, policy makers and media fellows at the event.

From	To	Title	People
09:30	09:45	Welcome	IWMI | Tata Trusts
09:45	10:15	**Conference Overview** Water, Energy, Climate and Livelihoods in India	Shilp Verma IWMI-Tata Program
10:15	10:45	**HIGH LEVEL PANEL** Welcome Remarks	Rachael McDonnell, IWMI S.K. Choudhary, ICAR Sanjiv Phansalkar, Tata Trusts Tushaar Shah, IWMI
10:45	11:00	**Conference Keynote** Climate-sensitive Dairy Development	Meenesh Shah Chairman, NDDB

Partners in Focus

Water, Energy, Climate, and Livelihoods in India

Shilp Verma | Suchiradipta Bhattacharjee

On behalf of the IWMI-Tata team, Shilp Verma (IWMI) welcomed the participants to the 2024 ITP Partners' Meet. He explained how the ITP Partners' Meet has always focused on practitioners and action on the ground, more than just research. This is in line with ITP's mandate of generating evidence that can inform, inspire and influence policy and practice. He briefly introduced the ITP team of young researchers and provided a detailed overview of the workshop agenda, thematic tracks, and technical sessions.

Rachael McDonnell (IWMI) highlighted the importance of partnerships and cooperation in addressing India's water challenge. She noted the criticality of collaboration and co-designfor developing innovative and impactful solutions and argued that while research can drive change at small scales, true impact can only be achieved by influencing policies that set frameworks, incentivize innovation, and guide strategic direction. S. K. Chaudhary of the Indian Council Of Agricultural Research (ICAR) emphasized the inter-connections between water, energy and climate. Citing the vulnerability of India's agriculture sector to climate change, and its impact on different aspects of the water cycle, he highlighted Government of India's efforts through flagship programs like NICRA (National Innovations in Climate Resilient Agriculture). He also referred to ICAR's work on agro-photovoltaics and several other initiatives to develop climate-resilient technologies. Stressing the role of collaborations, he expressed interest in the outcomes of the event and vowed to incorporate the recommendations in ICAR's work and strategies.

Former ITP leader, Sanjiv Phansalkar, expressed his happiness at being among familiar faces and 20 years of association with ITP. He commended the diversity of themes on offer in the agenda – all linked through a common thread of water-based livelihoods. ITP founding leader, Tushaar Shah (IWMI) welcomed the audience to the Partners' Meet and noted that ITP represents the oldest partnership between IWMI and a foundation in India, and globally. He explained that despite being a frugal program, ITP has been prodigious in its research output and policy impact. Recounting some of ITP's successes, he noted that institutions like INREM Foundation, CInI (Collectives for Integrated Livelihood Initiatives) and many others have been seeded by ITP. The Program has also trained numerous young professionals who have gone on to work in prestigious institutions around the world. ITP research and field pilots have informed and influenced major projects like SSP (*Sardar Sarovar Project*), and shaped flagship policies like PMKSY (*Pradhan Mantri Krishi Sinchai Yojana*), SKY (*Suryashakti Kisan Yojana*) and PM-KUSUM (*Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyaan*). ITP's Small Farmer, Prosperous Farmer (SFPF) initiative has seeded large-scale development investments through CInI's Lakhpati Kisan program – and later adopted by several similar initiatives. He concluded by encouraging a continuation of ITP's tradition of impactful research and strong partnerships.

In his conference keynote, Meenesh Shah (National Dairy Development Board) welcomed participants to the campus and emphasized the importance of water, energy, climate, and livelihood, particularly in the context of the dairy sector. At around 230 million metric tons per year, India is the world's largest milk producer – providing livelihood to about eight million farm families. He outlined NDDB's initiatives to address pressing issues such as low cattle productivity, high methane emissions, large water footprint and handling of stray cattle. He outlined NDDB's goal of achieving 'net-zero dairy' by 2047 through efforts in improving milk productivity, ration balancing, animal health, biogas and organic manure programs and water efficiency improvements. He particularly highlighted how NDDB has reduced water use in milk processing from 10 to 0.5 liters per liter of milk; and introduced advanced treatment technologies to recycle wastewater. He invited everyone to visit NDDB's model dairy villages, including solar cooperative in *Mujkuva* – established in collaboration with ITP and biogas plants.

P-2 Water and Philanthropy

Water-Security in *Viksit Bharat* 2047

Date: 18th September 2024 | **Venue: T.K. Patel Auditorium** | **Time: 11:30 – 13:00**

Custodian: Manisha Shah | **Chair: Rachael McDonnell** | **Rapporteur: Suchiradipta B.**

Since independence, government, civil society and market forces have contributed to improving water security and securing the country's water future in very different ways. By supporting all three actors with resources, knowledge, ideas, capacities and patient capital, philanthropic capital has played a key role in this process. As we look towards 100 years of India's independence, we are better-off than many countries but far from water secure. In fact, the demand for water in agriculture has been growing, and water quality is increasingly becoming a prominent issue across the country. Central and state governments have spent over INR 3 lakh crores (USD 33.8 billion) on the *Jal Jeevan Mission,* and yet, the majority of households do not have access to safe drinking water. Farmers across the country are suffering from extreme water conditions, often compounded by climate change and adverse terms of trade. As a nation, we do not seem to have a solid roadmap for implementing robust climate adaptation strategies.

We acknowledge that financial resources by themselves are not the answer. Thus, it is even more critical that we build a framework to guide philanthropic capital to ensure that it plays the catalytic role needed in the coming decades to deliver water security for all – for life, for livelihoods, for social and economic growth, and for the environment. In this context, this ITP-Synergos expert panel with senior leaders from philanthropy in water will share examples of successful deployment of private capital for water security, define the areas where investments can be enhanced, and visualize scenarios/indicators for a water secure nation by 2047, what exists and what is currently missing from the picture.

From	To	Title	People
11:30	11:35	Context Setting	Manisha Shah
11:35	11:55	Evolving vision and role of philanthropists for India's water future	Savji Dholakia
11:55	12:45	**Moderator: Apoorva Oza** How is Philanthropy Shaping India's Water Future? **Expert Panel: Gayatri Lobo | Mangesh Wange | Anjali Makhija | Sanjiv Phansalkar**	
12:45	01:00	Closing Remarks	Rachael McDonnell

Partner in Focus

SYNERGOS

AGA KHAN FOUNDATION

Will Viksit Bharat be Water-Secure *Bharat*?

Shilp Verma | Manisha Shah | Suchiradipta Bhattacharjee

ITP and Synergos collaborated for this session to discuss the vision for a water secure India by 2047. Manisha Shah introduced Synergos' work in bridging leadership to enhance collaborative problem-solving and shared messages from leading philanthropists on the theme. Rohini Nilekani (Rohini Nilekani Philanthropies) adopted a climate lens and focused on water storage, drainage and distribution while emphasizing the need for combining traditional wisdom with modern science through a decentralized approach. Amit Chandra (ATE Chandra Foundation) emphasized the need for investments in technology and community-centric processes. Nikhil Kamath (Rainmatter Foundation) focused on India's growing municipal water challenge, and highlighted the importance of supporting start-ups, empowering communities and fostering collaborations. Sunita Nadhamuni (Arghyam) emphasized the need for technologies that allow for localized solutions and spoke about India's Digital Water Infrastructure; inviting the donor community to co-invest in this foundational work. Dhruvi Shah (Axis Bank Foundation) emphasized the flexibility offered by philanthropic capital and the need to develop scalable solutions.

Savji Bhai (Dholakia Foundation) reflected on land and water conservation work and argued that such initiatives can be replicated at relatively low cost. Highlighting the potential of converting wastelands, harvesting rain, deploying renewable energy, and environmental protection, he emphasized on the need for aligning such work with government priorities. Declaring water "*a treasure more valuable than oil*", he acknowledged the support of Tata Trusts. Noting the urgency of climate change, he suggested that India could become a global leader in water conservation. He made an emphatic appeal for treating the environment as sacred and invited everyone to join him in conserving water and nature.

Apoorva Oza (Aga Khan Foundation) moderated a discussion on the role of philanthropic capital in shaping India's water future. He outlined four avenues for deployment of philanthropic capital – direct implementation, collaboration with government programs, investments in research, and support for innovations. Speaking about water security, Sanjiv Phansalkar (Tata Trusts) offered two interesting indicators – the absence of water tankers and of water-induced distress migration. He highlighted the importance of identifying and scaling innovations – particularly ones that are simple and inexpensive – that often don't receive institutional support. Referring to the work on local water conservation, Gayatri Lobo (ATE Chandra Foundation) spoke about how it has been scaled through government programs at various levels. Anjali Makhija (Sehgal Foundation) highlighted efforts in direct implementation and piloting new technologies, especially around clean drinking water. Mangesh Wange (Swades Foundation) emphasized the importance of training communities to manage water resources and the need for platforms such as ITP to increase awareness, share knowledge and improve the impact of interventions.

On collaborative philanthropy, the importance of consortiums, open data access, and enabling technologies were highlighted. The panel reflected on the need for individual recognition, and how it can hinder collaboration. Anjali Makhija suggested the creation of a collective centre of excellence for research, training and fostering innovation. Summarizing the discussion, Apoorva noted that important themes like floods, water quality, and displacement can get overlooked and urged philanthropies to effectively collaborate in identifying and addressing such gaps.

Concluding the session, Rachael McDonnell (IWMI) re-emphasized the flexibility of philanthropic capital for achieving results, unlike the slower processes tied to government spending or foreign aid. She appreciated the diverse entry points taken by different organizationsand stressed on the need for connecting these efforts. She also highlighted the potential for influential figures to bring water security to the fore in the country's development discourse and thanked the speakers and participants for their thoughtful inputs.

T1-S1 Energy Transition in the Gangetic Plains

Underscoring the need for Policy Coherence

Date: 18th September 2024	**Venue: Training Room #01**	**Time: 14:30 – 16:00**
Custodian: Avinash Kishore	**Chair: Prasun Das**	**Rapporteur: Nikunj Usadadia**

Much of the eastern Gangetic plains are witnessing significant changes in the rural energy profile. This is particularly true in India where farm power electrification is growing rapidly, and it is not difficult to find rural grids energized for 20-22 hours. This is in stark contrast to the 1980s when the region's agriculture was systematically de-electrified owing to governance challenges. The situation has created a strange conflict with government programs simultaneously subsidizing farm power and off-grid solar pumps.

This session will share the results of a recent large-scale survey of farmers in the region undertaken as part of the NEXUS Gains initiative. It will also draw on recent IWMI and ITP studies in eastern India, as well as experience from Nepal Terai and Bangladesh to deliberate on how changes in the regions 'energy profile' is reconfiguring the energy-irrigation nexus' and impacting lives and livelihoods in the region.

From	To	Title	People
14:30	14:45	From Diesel to Electric to Solar Pumps for Irrigation in Bangladesh and West Bengal	Archisman Mitra
14:45	15:00	Increasing Use of Groundwater and Electric Pumps in Nepal	Shisher Shrestha
15:00	15:15	Electrification of Irrigation in Bihar: Opportunities and Challenges	Avinash Kishore
15:15	15:50	**OPEN DISCUSSION | Lead: Avinash Kishore** Catalyzing 'Just Energy Transition' in Eastern Gangetic Plains	
15:50	16:00	Reflections and Closing Remarks	Prasun Das

Partners in Focus

Electrification and Solarization in the Gangetic Plains

Avinash Kishore | Nikunj Usadadia

For long, farmers in the eastern Gangetic plains have had to rely on expensive and polluting diesel to power their irrigation pumps. In recent years, with the expansion of off-grid solar irrigation pumps and renewed efforts to improve farm power supply, the situation is changing. This change is also reshaping the water-energy-food nexus in the region.

Archisman Mitra (IWMI) shared results from field studies in West Bengal and Bangladesh where intensive paddy cultivation, high farm power tariffs and diesel pumps dominate the rural landscape. He noted linear declining trends in groundwater in both the regions and showed that compared to diesel pump owners, electric pump owners use land more intensively, allocated more of their land to rice, irrigated their paddy more frequently, and were more likely to sell water. In West Bengal, despite significant expansion in electric pumps, there has been no discernible impact on cropped area and cropping intensity. Field studies find positive association between pump electrification and boro paddy area in Bangladesh. He argued that there's substantial scope for solar pumps in West Bengal, but it would require better integration with state programs, attractive loan facilities and awareness.

Sharing experience from Nepal *Terai*, Shisher Shrestha (IWMI) noted that since 2010, Nepal has witnessed rapid rural electrification, but diesel continues to dominate. Electric pumps account for 22% of agricultural energy consumption; and solar pumps only around 0.51%. Sharing data from a 2021 phone survey, he argued that while solar pumps have led to reduced diesel consumption, they have not replaced diesel pumps. He also shared the experience of grid-connected solar pump – piloted by IWMI in Parsa, that has led to reduction in diesel use, increase in irrigated area and additional income for farmers. Despite these positives, he noted that net-metering agreement process is complex and technical challenges with inverters persist. He pitched for better synergies between grid-expansion and solar promotion policies, and the need for better groundwater regulations.

Sharing results from a large sample survey in Bihar, Avinash Kishore (IFPRI) spoke about rapid rural electrification – about half a million new electric pumps – leading to more irrigation, higher yields, lower crop losses in drought years, and expansion in summer cultivated area. He pointed to growing preference for submersible pumps as a cause for worry as its higher installation costs lead to entry barriers and less competitive water markets.

The discussion that followed centred around the question of which path – public investments in expansion of farm power supply or in promoting solar pumps – would lead to more desirable outcomes in terms of improving access to reliable and affordable energy for irrigation, and more competitive irrigation service markets while maintaining groundwater sustainability. The session chair, Prasun Das (GIZ) pointed that grid-connecting solar pumps and incentivizing evacuation of surplus energy can reduce groundwater depletion. Citing ITP's work, Shilp Verma (IWMI) noted that '*one-solar-pump-per-farmer*' was not needed to reliably and effectively expand irrigation coverage and that the focus should be on solar irrigation entrepreneurs and enterprises. Betting against the prospects for solarization of irrigation in Bihar, Avinash argued that in the next five years, less than 5% of the irrigated area would be irrigated by solar pumps. This nicely set the context for the following session in the track, on energizing Bihar's agriculture.

T1-S2 Energizing Bihar's Agriculture

Solar, Diesel and Electric

Date: 18th September 2024 | **Venue: Training Room #01** | **Time: 16:30 – 18:00**

Custodian: Tushaar Shah | **Chair: Vishwa Ballabh** | **Rapporteur: Nikunj Usadadia**

Despite abundant groundwater resources, small farmers in Bihar are unable to make full use of this precious resource due to energy poverty and the high and rising cost of diesel. The emergence and aggressive promotion of solar irrigation pumps offers a new opportunity for state like Bihar to deliver reliable and affordable clean energy for meeting farmers' pumping needs. At the same time, electricity utilities in Bihar have been improving rural grids, with subsidized farm power connections growing rapidly. As a late electrifier of agriculture, and it now stands on the 'farm power crossroad' – should it offer farmers free or highly subsidized grid power, as several other states have done at their own peril, or should it use solar energy creatively to chart out a new irrigation future for its farmers.

This collaborative session between ITP and the Aga Khan Rural Support Programme, India (AKRSP-I), brings together some of the key researchers, thinkers and practitioners on this subject to share some recent work to seed a lively discussion on strategies for energizing Bihar's agriculture.

From	To	Title	People
16:30	16:40	A decade of IWMI-AKRSP Action Research collaboration in Bihar: A historical overview	Naveen Patidar
16:40	16:50	AKRSP's experience with women's SHGs as Solar Irrigation Entrepreneurs	Meenakshi Singh
16:50	17:00	**ITP-AKRSP-I Keynote** Solar Pumps and Bihar's Irrigation Future	Tushaar Shah
17:00	17:50	**PANEL DISCUSSION | Moderator: Meenakshi Singh** Solar Pumps and Bihar's Irrigation Future **Panel: Apoorva Oza | Ayushi Uppal | Avinash Kishore**	
17:50	18:00	Reflections and Closing Remarks	Vishwa Ballabh

Partners in Focus

Delivering Reliable and Affordable Irrigation in Bihar

Tushaar Shah | Nikunj Usadadia

Bihar is among the most irrigated states in India – just after Punjab and Uttar Pradesh – and this is despite the high cost of diesel-powered irrigation imposed on farmers. To reduce dependence on diesel, two broad strategies can be seen in action – simultaneously. On the one hand, government has been offering small-sized farm power connections at subsidized tariffs. At the same time, government programs as well as civil society led efforts have promoted solar systems to power irrigation.

Discussing a decade of action research with IWMI-Tata Program, Naveen Patidar (AKRSP-I) discussed key lessons from the Chakhaji pilot and highlighted how the network of buried pipes and a significant loan component enabled and incentivised solar entrepreneurs to maximize asset utilization and irrigated area. He also highlighted the importance of right selection of participating farmers to be promoted as entrepreneurs.

Meenakshi Singh (AKRSP-I) discussed the ongoing experiment conducted through ITP and Solar Energy for Rural Livelihoods (SE4RL) that offered solar pumps as a micro-enterprise for SHG women; and efforts to scale-up the model through the government of Bihar's Jeevika program. She elaborated on the *Solar Didi* model and compared it with group-based solar irrigation schemes. She recounted key challenges – initiation, financing, and operations – and ways in which the team was addressing them. She highlighted the impact of women-led solar irrigation development through economic empowerment, social and institutional empowerment, technological and digital empowerment, and increased mobility.

Tushaar Shah (IWMI) argued that the key challenge in Bihar is not access to irrigation, but the yield penalty imposed by under-irrigation, resulting from the high cost of diesel irrigation. He argued that Bihar's policy of offering subsidized farm power is making solar pumps less attractive – but in the long-run, the best strategy for Bihar would be to solarize tubewells and electrify villages. He outlined the 'solar saturated villages' model where 7-8 solar entrepreneurs – each equipped with a 5-6 kWp solar pump and ~1500 feet of buried pipes – with overlapping commands can spur competitive, buyer-friendly irrigation service markets. He argued that Bihar's 45,000 villages and 5.7 million ha of net cultivated area offers scope for roughly half a million solar irrigation entrepreneurs.

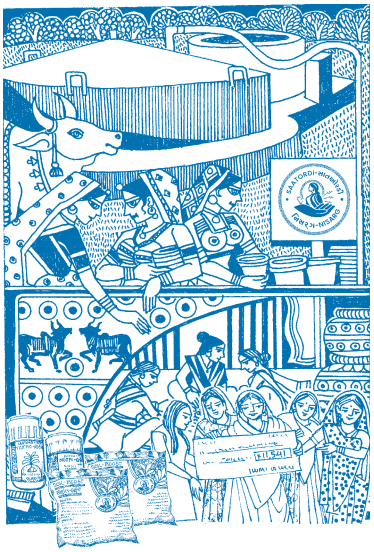
The panel comprising of Apoorva Oza (AKF), Ayushi Uppal (SPEF) and Avinash Kishore (IFPRI) discussed various alternatives for effectively, sustainably and equitably powering Bihar's agriculture sector. A key point discussed was the utilization of solar assets that can make or break the economics of the investment. A solar pump that is used only for a handful of hours in a year represents a colossal waste of public resources. Also discussed were fragmentation of water markets, economics of grid-expansion and the experience of subsidized farm power from other states. The session chair, Vishwa Ballabh (XLRI) summarized the proceedings and outlined the next steps for Bihar's agriculture.

T2-S1 From Dung to Dollars

Unlocking Fortune in Peri-Urban *Gobar* Value Chains

Date: 18th September 2024 | **Venue: Training Room #03** | **Time: 14:30 – 16:00**

Custodian: Niraj Trivedi | **Chair: Ganesh Neelam** | **Rapporteur: Amit Wajpe**



India's 300-million strong dairy economy produces a billion tonnes of Gobar (dung) each year. Much of this is applied directly to farms while some is converted to dung cakes and used as cooking fuel. With a renewed interest in unlocking the nutrient and bioenergy value locked in this poorly understood value chain, India's Gobar economy is witnessing a resurgence. Institutions like NDDB-MRIDA, Sistema bio and others have been vigorously promoting family-sized biogas plants in rural areas and aggressively promoting the use of biogas as a cooking fuel and dung and slurry-based products for farm application.

One setting where the standard 'household biogas plant' struggles to blossom is peri-urban villages. Households here have limited space and little agricultural land to consume dung and slurry-based products. The growing penetration and policy support for LPG and piped cooking gas also makes biogas less attractive as a cooking fuel. And yet, households continue to hold cattle for milk and dung is often stored in open heaps to be sold-off to farmers from neighbouring villages periodically. Dung heaps add to the drudgery of women often in charge of taking care of the animals; they also impose a significant sanitation and pollution challenge.

What might be an alternative Climate-Smart model for developing peri-urban Global value chains? This session discusses an ITP and SPEF (Sustain Plus Energy Foundation) collaborative pilot being tested in *SaatOrdi* village and the numerous opportunities it offers for converting dung to dollars.

From	To	Title	People
14:30	14:40	Opportunities and Challenges in India's Bioenergy Economy	B. Shetkar
14:40	14:50	**ITP Keynote** Entrepreneur-led Village-scale Biogas: ITP's *SaatOrdi* Pilot	Niraj Trivedi
14:50	15:00	The mechanics and economics of direct slurry application on farms	Ajay Barad
15:00	15:10	The market for slurry-based products in and around SaatOrdi	Ajay/Atufa/Sakshi
15:10	15:50	**DISCUSSION | Context and Questions : N. Trivedi | Moderator: B. Shetkar** A Strategy for Climate Smart Peri-Urban *Gobar* Value Chains **Panel: Tushaar Shah | Amrita Doshi | Himanshu Mishra | Yogeshvari Jhala**	
15:50	16:00	Reflection and Closing Remarks	Ganesh Neelam

Partners in Focus

Lessons from ITP's *SaatOrdi* Pilot

Niraj Trivedi | Amit Wajpe

The session focused on the pilot experience in *Saatordi* village, exploring how peri-urban dung could be reimagined as a climate-smart value chain. Discussions examined the economics of centralized models, women's drudgery, and innovations required to make biogas viable in landscapes where LPG dominates. The session underscored how gobar, long viewed as a sanitation challenge, is being reframed as a community asset with potential to drive clean energy transitions, strengthen soils, and open pathways for enterprise.

Bhimashankar Shetkar (NDDB Mrida) opened with a striking statistic: India's bovine population generates 1,653 million metric tonnes of dung annually, nearly 992 MMT recoverable. Harnessed smartly, gobar could meet 30% of nutrient needs while fuelling a circular economy. Two pathways took centre stage: large centralized plants like NDDB Mrida's 100 MTPD facility and decentralized household units, already 30,000 strong. Both offer energy, organic manure, and jobs, but face hurdles from adulteration to service gaps and steep costs.

A standout conversation revolved around ITP's *Saatordi* pilot, introduced by Niraj Trivedi (IWMI). In Saatordi, 70% of families are landless yet rear 200 cattle, leaving dung to pile up and create unhygienic surroundings. The pilot tested whether dung could power a new economy: a plant now supplies balloon-based biogas to 16 families while marketing 73,500 liters of slurry, earning nearly INR 70,000 (USD 789.67) and enriching soils. Contrasted with land-rich Dhundi, participants reflected on where gobar chains might scale.

Building on this, Ajay Barad (former AAU student) shared insights on slurry use. He noted that farmers can apply raw slurry directly in the standing crop along with irrigation water, in place of farm yard manure. Sixteen farmers purchased 73,000 liters, generating nearly INR 70,000 (USD 789.67), but demand exceeded 2.5 lakh liters, limited by supply. Beyond farms, Ajay, Atufa, and Sakshi from IRMA (Institute of Rural Management Anand) highlighted slurry's potential for products like vermicompost, gardening inputs, and incense sticks. Farmer interviews revealed strong demand among urban gardeners, sparking curiosity around Nisarg's branded line. Yet questions lingered on costs and whether entrepreneurs could realistically build a circular economy around waste.

The panel discussion, moderated by Bhima (NDDB Mrida), drew the audience into debate on village-scale biogas, its promises and pitfalls. Himanshu Mishra (Khethworks) detailed design innovations, from semi-flexible geomembrane digesters to balloon distribution systems. Tushaar Shah (IWMI) reflected on India's "gobar economy," noting incomes could rise 15–20% if managed well. Amrita Doshi from SPRERI (Sardar Patel Renewable Energy Research Institute) stressed biogas should be seen not as an LPG replacement but as a complementary source, especially with slurry benefits. The forum circled around scalability, women's drudgery, and shifting aspirations, opening possibilities for biogas in rural households.

In closing, Ganesh Neelam (CInI) tied the threads together, emphasizing the promise of replacing part of household fuel, smarter slurry uses with farmer training, and partnerships with institutes like Anand Agricultural University (AAU). He highlighted ongoing trials to tackle challenges from low winter gas in Uttarakhand to methane management, and spotlighted opportunities for women entrepreneurs. The broader message was clear: biogas is not just a rural energy option but a pathway where innovation, collaboration, and community ownership can shape a climate-sensitive future.

T2-S2 Climate-sensitive Dairy Development

Opportunities for Smallholder Farmers

Date: 18th September 2024 | **Venue: Training Room #03** | **Time: 16:30 – 18:00**

Custodian: Sneha S.B. | **Chair: Rajesh Sharma** | **Rapporteur: Philip Kuriachen**

India has emerged as the worlds' largest dairy producer, the livelihoods of 70 million farmers spread across the country. Milk co-operatives have been central to the emergence of India's dairy industry Dairying with its steady cash flows, is a promising alternative livelihood activity in drought prone regions. Milk producer companies (MPC's) have emerged as new generation co-operatives, with improved governance structures and business orientation. However, only a fraction of the milk produced in the country is sold through formal channels. MPC's hold the promise of formalizing milk marketing channels.

The session discusses the potential of dairying as a drought proofing strategy in agrarian households. What are the design features of MPCs? How have MPCs promoted dairy development in non-traditional regions? How can MPCs help drought proof livelihoods?

From	To	Title	People
16:30	16:40	**Invited Keynote** Dairy Development in a Warming World	Bhupendra Phondba
16:40	16:50	Dairy Development as an Instrument for Smallholder Prosperity	Amitanshu Choudhary
16:50	17:00	**ITP Keynote** Making MPCs Work for Smallholders	Sneha S.B.
17:00	17:50	**PANEL DISCUSSION | Moderator: Philip Kuriachen** Climate-sensitive, Smallholder-friendly Dairy Development **Panel: Jaipal Singh Kaushik | Subhasis Mandal | Snehal Mishra**	
17:50	18:00	Reflections and Closing Remarks	Rajesh Sharma

Partners in Focus

Enabling Conditions for Climate-Resilient Dairy Sector

Sneha S. B. | Philip Kuriachen

The session built upon the role of dairying as a resilient livelihood, exploring how smallholders can navigate challenges. Building on the promise of Milk Producer Companies (MPCs) to formalize milk value chains and support rural upliftment, discussions reflected on eastern India. Focus was on strategies to enhance viability and climate resilience in dairy farming. The session emphasized how governance, adaptation measures, and supportive policies can strengthen livelihoods and ensure sustainable development.

The session opened with a reminder: the dairy sector is on the frontlines of climate change. Rising temperatures could reduce milk yields by 40%, as animals face lower feed intake, impaired absorption, and heat stress. Challenges extend beyond the shed, fodder quality is declining, water resources strained, land competition rising, and vector-borne diseases increasing. Against this backdrop, Bhupendra Phondba (NDDB) presented a science-based roadmap for climate-resilient dairying, highlighting ration balancing, fodder systems, breeding, manure management, and renewable energy. These measures can cut emissions, reduce water footprints, and raise incomes.

Amitanshu Choudhary (Tata Trusts) led the discussion as it shifted to dairy development as a driver of prosperity, especially for women, drawing on the Dairy Health and Nutrition Initiative of India Foundation's (DHANII) context-specific models. Focus was on its layered approach: MPCs in plains, micro-dairies in hilly regions, and 'layered dairying' under the Lakhpati Kisan initiative. Women-led MPCs with NDDB and Mother Dairy stood out, with payments from INR 195 crore (USD 21.99 million) to INR 1,103 crore (USD 124.4 million). In Himalayan districts, 500-litre micro-dairies improved access, though fodder scarcity and low output persist. The session explored eco-sensitive practices, resilient fodder, and managing heat stress, reinforcing that dairying builds resilience, empowerment, and rural incomes.

Sneha S.B. (IWMI) steered the conversation to a critical question: how can Milk Producer Companies (MPCs) truly work for the rural poor? This sparked discussion on their transformative potential. Spotlight was on Balinee MPC from Bundelkhand, a drought-prone region with weak markets and high risks. Its rental-based, asset-light model showed how lean operations can scale impact. Participants noted its replication across the MPC network by National Dairy Services (NDS). Evidence from a recent ITP study using NSSO data revealed that in drought-prone regions, dairy households earned over INR 25,000 (USD 2.82 billion) more annually, making dairy a buffer.

The panel discussion, moderated by Philip Kuriachen (IWMI), brought focus to the need for climate-sensitive dairy development, emphasizing solutions resonating with farmers. Panelists Jaipal Singh Kaushik (Tata Trusts), Subhasis Mandal (NDDB), and Snehal Mishra (AAU) shared perspectives on challenges and opportunities. While programs prioritize nutrition and feed management, evidence from Central Gujarat shows a gap between design and adoption. Instead of adopting feed innovations, farmers are shifting from high-yielding exotics toward resilient indigenous and crossbred cattle. This organic adaptation was highlighted as an area for policy attention. The panel underscored that in non-traditional dairy regions, diversification holds promise but requires strategy. Identifying viable milksheds is the first step; only then should productivity efforts begin. Once stable, diversification into value-added products like flavoured milk can expand markets and strengthen economies. Water also emerged as a theme, with advocacy for shifting dairy growth to groundwater-abundant Eastern India. Addressing regional constraints through targeted strategies was critical. Institutional aspects, especially strengthening MPCs through governance and business orientation, were emphasized as vital for resilient, climate-ready value chains.

The session ended with closing remarks from Rajesh Sharma, who stressed that climate change brings multiple challenges to the dairy sector, requiring technical solutions, better institutions, balanced investments, and stronger farmer support.

T3-S1 Blue Boundaries

Protecting Land from Sea Water

Date: 18th September 2024 | **Venue: Training Room #04** | **Time: 14:30 – 16:00**

Custodian: Vidya Mandave | **Chair: Rajesh Shah** | **Rapporteur: Manya Dixit**

India's massive coastline lies adjacent to about 30 mha of coastal farmlands, is home to 170 million people and nearly a fifth of the country's livestock population. Coastal farms face unique salinity-induced challenges that limit their crop choices, reduce the cropping calendar, and dampen crop productivity. Further, unlike their inland peers, they cannot pump groundwater without serious negative consequences caused by disturbances in the fragile hydrodynamic equilibrium between freshwater and seawater.

To address these challenges, integrated coastal planning is recommended and several governments have invested in tidal regulators, bandharas, and other conservation structures along the coast. Gujarat's western coastline in Saurashtra has seen decades of efforts by government as well as civil society to help coastal communities develop resilient lives and livelihoods. Recently, ITP collaborated with Gujarat's CSPC (Coastal Salinity Prevention Cell) to undertake a quick assessment of such structures. This session shares work done as part of this ongoing collaboration and highlights the special water management challenges and opportunities on offer in coastal agriculture and agriculture-based livelihoods.

From	To	Title	People
14:30	14:40	Management of Coastal Salinity for Transforming Agri-Food Systems in the Ganges Delta: Turning Grassroots Experiences into Policy	Subhasis Mandal
14:40	14:50	Water Management in the Coastal Zone of Bangladesh	Marie Charlotte Buisson
14:50	15:00	**ITP Keynote** Resilient Coastal Agriculture amidst Climate Change and Sea-water Intrusion	Vidya Mandave
15:00	15:50	**MODERATED DISCUSSION | Moderator: Eklavya Prasad** Balancing the Sea Shore: Strategies for Coastal Livelihoods **Panel: Uday Gaikwad | D. Vaghasiya | R. Ramasubramanian | Vaibhav Mantri**	
15:50	16:00	Concluding Remarks	Rajesh Shah

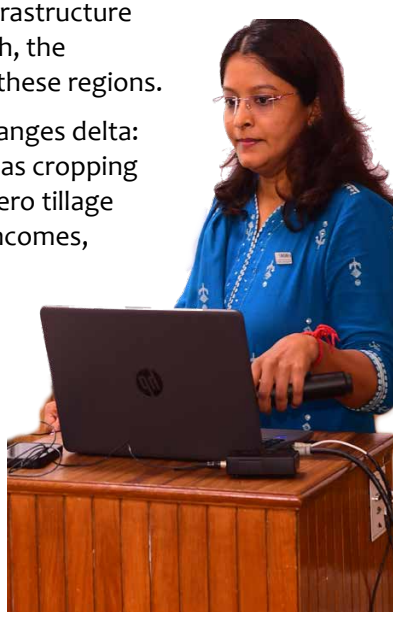
Partners in Focus

CSPC
Coastal Salinity Prevention Cell
AN INITIATIVE OF TATA TRUSTS, AKRSPI(I) AND ACF

Safeguarding India's Coastal Agri-ecosystems

Vidya Mandave | Rajesh Shah

The session explored the unique vulnerabilities of India's coastal agriculture, shaped by salinity intrusion, fragile hydrological balances, and mounting pressures from climate change, industrialisation, and infrastructure development. Building on experiences from Gujarat, the Ganges delta, and coastal Bangladesh, the discussion highlighted local innovations and policy opportunities to strengthen livelihoods in these regions.



Opening the session, Subhasis Mandal (ICAR) outlined the constraints facing farmers in the Ganges delta: salinity, waterlogging, poor soil health, and lack of irrigation in dry seasons. Approaches such as cropping system intensification and land shaping were discussed as possible solutions. He noted that zero tillage potato cultivation with straw mulching and rice-based diversification have increased farmer incomes, while raising land and creating water harvesting structures has reduced drainage congestion and salinity build-up.

The discussion then shifted to coastal Bangladesh, where waterlogging and salinity combine to depress yields and delay cropping decisions. Marie Charlotte Buisson (IWMI) demonstrated evidence from household surveys and water management experiments that showed the duration of submergence to directly reduce dry season cultivation options, forcing farmers to shift to sesame or lentils with lower yields. Interventions ranging from canal desilting and sluice repair to crop diversification and farmer training, were found to significantly reduce the likelihood of waterlogging and expand opportunities for sunflower, maize, mung bean, and aquaculture.

The western coastal region of Gujarat provided a contrasting perspective, where decades of investment in tidal regulators, check dams, and bandharas have improved groundwater quality, reduced soil salinity, and expanded cropping choices. Vidya Mandave (IWMI) reflected on how these changes allowed farmers to shift toward commercial crops alongside higher yields of groundnut, black gram, and wheat. However, participants stressed the persistent risks of groundwater overextraction, poor maintenance of structures, and industrial contamination. Farmers underscored the need for smaller storage ponds, stronger repair systems, and proactive safeguards against pollution. Based on experience in Saurashtra, Alka Palrecha (People in Centre) added that coastal reservoirs, a vital freshwater source, require far greater attention.

Seaweed cultivation was highlighted as an alternative livelihood for coastal communities, particularly since it thrives in saline environments. Vaibhav Mantri (Central Salt & Marine Chemicals Research Institute, Council of Scientific & Industrial Research; CSIR-CSCMRI) spoke of the commercial success of their seaweed farming initiative in Tamil Nadu, which informed NITI Aayog's policy framework for expanding seaweed value chains across India's coasts. Challenges remain around seed procurement, scaling, and community adoption, but there is a clear business opportunity in developing local seed markets and strengthening farmer-government linkages. Beyond seaweed, he stated, research in saline agronomy has introduced products such as low-sodium salt derived from salt-tolerant plants. But market uptake has been slow, limiting farmer adoption and highlighting the need for value-chain support.

Mangroves were underscored as a critical ecological and livelihood resource. Institutions like MSSRF have restored thousands of hectares of degraded mangroves, integrating them with aquaculture and women-led fishery enterprises. While national policies provide protection under forest and wildlife laws, climate-induced threats such as cyclones and rising salinity continue to erode mangrove cover. Participants stressed the need for research on mangrove–livelihood linkages beyond the Sundarbans. The discussion also touched upon how large-scale salinity management requires both technical interventions (salinity mitigation, recharge, reclamation) and social strategies (community engagement, water-sharing agreements, and categorisation of villages by salinity severity). Interventions such as water budgeting and 'one water: one community' literacy campaigns were highlighted as effective in building resilience.

T3-S2 Rejuvenating Public Irrigation Systems

Opportunities for Conjunctive Management of Surface and Groundwater

Date: 18th September 2024 | **Venue: Training Room #04** | **Time: 16:30 – 18:00**

Custodians: Alka P. | Gyan P. Rai | **Chair: Peter Mollinga** | **Rapporteur: Vidya Mandave**

Despite massive investments, the returns from India's public irrigation systems have been falling. In this session, we look at different ways through which government and civil society is attempted to enhance these returns and make the sharing of benefits more equitable. In Gujarat and Punjab, significant investments have been made to invest in networks of buried pipes to deliver canal water directly to farmers' fields. ITP has been closely following this experiment in the Sardar Sarovar Command since its inception. In the last year, ITP, The Nature Conservancy (TNC) and People in Centre (PiC) collaborated to conduct field studies in both states to understand farmers' response to these efforts. We also discuss experience from Madhya Pradesh's innovative Mohanpura-Kundaliya project which delivers irrigation water directly from the dam to farmers' fields through Pressurised Irrigation Network. From West Bengal, we discuss the impact of an all-women Water Use Association on livelihoods and women's empowerment. Finally, we hear about the importance of proper water accounting for assessing system performance. These are followed by a panel of experts to deliberate on pathways for catalyzing effective and efficient conjunctive use and maximizing the net positive impact of India's massive public irrigation systems.

From	To	Title	People
16:30	16:45	Getting the Irrigation Statistics Right	M. Dinesh Kumar
16:45	17:00	Piped Delivery of Canal Water in Punjab	Gyan P. Rai
17:00	17:10	**ITP Keynote** Piped Delivery of Canal Water: Contrasting Responses in Gujarat and Punjab	Alka Palrecha
17:10	17:50	**MODERATED DISCUSSION | Moderator: Alka Palrecha** Catalyzing Effective and Efficient Conjunctive Use **Panel: M.B. Joshi | Sachin Oza | Gagandeep S. Sandhu | P.S. Sandhu**	
17:50	18:00	Concluding Remarks	Peter Mollinga

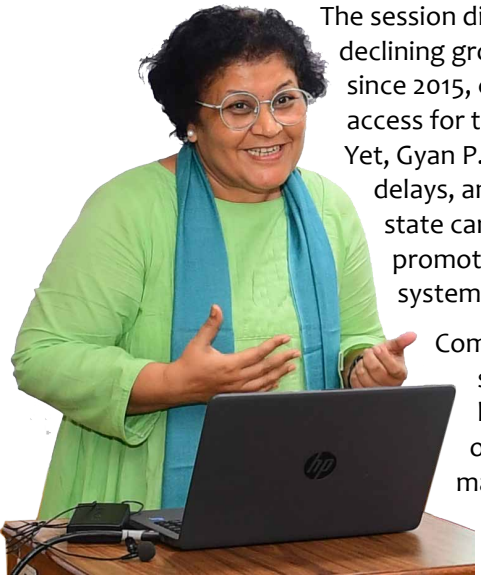
Partner in Focus

People in centre | The Nature Conservancy

India's Experiments with Piped Canal Irrigation

Alka Palrecha | Gyan P. Rai | Vidya Mandave

This session explored the challenges and opportunities in revitalizing India's large public irrigation infrastructure, drawing on experiences from Punjab and Gujarat. Opening the session, M. Dinesh Kumar (Institute for Resource Analysis and Policy; IRAP) underscored persistent flaws in India's irrigation statistics, particularly the gaps between potential created and utilized. He noted how unauthorized canal and river lift irrigation remain excluded from official figures, obscuring the true extent of water use.



The session discussed Punjab's experience with underground pipeline systems (UGPL). Facing declining groundwater tables, Punjab has experimented with pipelining last-mile canal irrigation since 2015, covering nearly 40,000 hectares. The system has brought clear benefits: better water access for tail-end farmers, higher productivity, reduced seepage losses, and easier maintenance. Yet, Gyan P. Rai (The Nature Conservancy) highlighted constraints of funding, bureaucratic delays, and uneven water access. Future priorities could include integrating centre and state canal schemes, digitizing networks, integrating agriculture and horticulture efforts, promoting conjunctive water use, converting distributaries into solar-integrated UGPL systems, and ensuring targeted resource allocation.

Comparing Gujarat and Punjab, Alka Palrecha (People in Centre) noted how rapid scaling under the Sardar Sarovar project has struggled with adoption in Gujarat. This has been due to socio-economic challenges – canal water theft and the low cost of transporting canal water – combined with technical shortcomings such as poor maintenance, low discharge, and insufficient flow in long canals. Contrastingly, in the UGPL system in Punjab, concrete pipe systems extend beyond sub-minors up to water courses with outlets at each connection, and coordination across multiple departments keep per-hectare costs low.

The panel discussion highlighted how UGPL systems function differently across states. In Punjab, water user associations (WUAs) have long played a central role, ensuring that water distribution follows warabandi under the Northern India Canal Act. Farmers actively participate in each stage of UGPL implementation, helping resolve disputes locally. The use of concrete pipelines has proven cost-effective and durable, further strengthening the system. In Gujarat, the main challenge has been theft and weak farmer participation. Early trials by SSNNL (*Sardar Sarovar Narmada Nigam Ltd.*) in 2010 showed that concrete pipe joints limited large-scale expansion. Farmers were initially reluctant to bear even 10% of project costs, leading to limited ownership.

On conjunctive water use, Punjab has seen reduced electricity use but has had limited gains in groundwater savings as tube wells continue to complement surface water. In Gujarat, conjunctive use requires more localized planning. Even in 'safe zones' with less than 70% groundwater extraction, categorization by use intensity was suggested to guide water allocation.

In his concluding remarks, session chair Peter Mollinga (School of Oriental and African Studies, SOAS; Center for Development Research, ZEF) noted that Punjab's historical advantage of *warabandi* cannot be easily replicated elsewhere. He pointed to the lack of systematic research on regional differences in irrigation governance, emphasizing that local problems often have structural causes beyond the village level. He also raised the question of who really has an interest in accurate irrigation statistics and why innovations in irrigation management have stagnated since the 1950s. Revitalizing India's public irrigation, the session concluded, requires not just technical improvements but also renewed attention to institutional and governance dimensions.

T4-S1 A Climate Resilience in Asia's Water Towers

Himalayan Hydrology and Springs

Date: 18th September 2024 | **Venue: Training Room #06** | **Time: 16:30 – 18:00**

Custodians: Rajesh T. | Arun P. | **Chair: Ravi Chopra** | **Rapporteur: Lamnganbi Mutum**

Often referred to as the 'Water Towers of Asia', the mighty Himalayas feed many of Asia's largest rivers and provide water to well over a billion people in India, Pakistan, Bangladesh, and China while forming a hydrological barrier between the Indian sub-continent and the rest of Asia. The Indian Summer Monsoon is the primary source of moisture for most of the area, but the Western Disturbances are responsible for much of the winter precipitation. Rising temperatures and climate change are predicted to impact the Himalayan sub-regions differently and will likely lead to melting glaciers, increased forest fire and changing rainfall frequency which adversely impact the recharge of mountain aquifers. Simultaneously, the region is witnessing significant changes owing to development and modernization with growing dependence on infrastructure and imported inputs for supporting local livelihoods.

The objective of this session is to bring together key civil society partners invested in sustainable development of the region and to initiate a discussion on the role that IWMI-Tata Program can play in supporting these partners. The two-part session will revolve around three themes and seven sub-themes identified for discussion. The first part of the session (T4S1A) will focus on providing an overview to the impacts of climate change in the Himalaya and Himalayan hydrology while the second part (T4S1B) will focus on aspects of sustainable development of Himalayan communities.

From	To	Title	People
16:30	17:00	**ITP Keynote** Climate Resilience in Asia's Water Towers	Rajesh Thadani and Arun Pandhi
17:00	17:30	Hydrological Principals of Mountain Aquifers	Himanshu Kulkarni
17:30	17:40	Delivering Municipal Water in the Hills: Constraints and the Need for Nature-based Solutions	Vishal Singh
17:40	17:50	From Peaks to Prosperity: Restoring Climate Resilience in the Himalayas	C. Biradar
17:50	18:00	Reflections and Plan for Next Day	Ravi Chopra

Partners in Focus

NEIDA CEDAR CENTRE FOR ECOLOGY DEVELOPMENT AND RESEARCH

Himalayan Springs, Cities, and Communities

Rajesh Thadani | Arun Pandhi | Lamnganbi Mutum

This session discussed the broad regional vulnerabilities to concrete strategies for adaptation and sustainable development in the Himalayan region. It highlighted the importance of reviving mountain springs, creating recharge structures, and using tools like remote sensing to strengthen water security in the vulnerable landscape. Speakers also noted equity concerns in urban water access and the potential of integrating nature-based solutions with scientific knowledge and community participation. The session underscored holistic, inclusive approaches to build Himalayan resilience and outlined areas where ITP could support local partners.

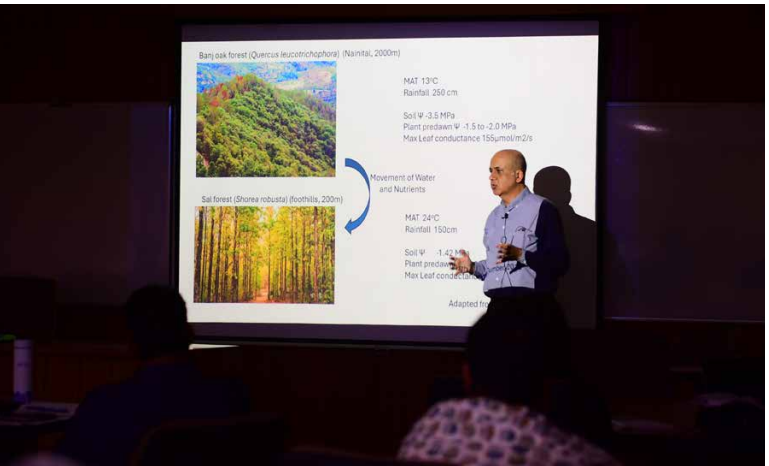
The first presentation set the tone with an ITP keynote by Rajesh Thadani (Centre for Ecology Development and Research, CEDAR) and Arun Pandhi (P-Green Solutions). What began as a reminder that one in seven people worldwide depends on Himalayan rivers quickly turned into a sobering account of fragile water systems. The speakers highlighted uncertainties in Himalayan hydrology, gaps in understanding geology, aquifers, and human pressures, referring to the case of Lake Sukhatal where unrestricted water extraction and unplanned development endangered one of Nainital's crucial water sources. Climate change fuels forest fires, transforming landscapes into tinderboxes. Yet, the keynote showed hope: spring revival projects, eco-tourism in Dzuleki village, and remote sensing can guide water-smart resilience in high mountains.

Following the keynote, the session moved into a more focused exploration with Himanshu Kulkarni's (Advanced Center for Water Resources Development and Management, ACWADAM) presentation on the unique hydrology of the Himalayas. Reviving springs emerged as both ecological necessity and community lifeline. With considerable spring revival work happening in Uttarakhand, the policy footprint of this work has extended across the mountains with between 15,000–20,000 springs targeted for revival across Meghalaya to Himachal Pradesh. Yet, knowledge gaps remain nearly 50 million springs exist, many invisible in policy. The springshed concept, linking springs, aquifers, and watersheds, offers challenge and opportunity, while ICIMOD's stepwise mapping guides practical, participatory revival.

Building on the conversation around aquifers and springs, the session then turned to the urban face of the crisis with Vishal Singh's (CEDAR) presentation on municipal water systems in the Himalayas. Himalayan towns face population growth outpacing water supply, deepening groundwater stress, and serious flood risks. Uttarakhand exemplifies a 50% water deficit, with pumping schemes from distant rivers to Shimla, Almora, and Nainital proving both costly and difficult. Such projects tend to trigger landslides and destabilize slopes. At the same time, equity issues persist with wealthier areas getting priority and poorer households relying on tanker mafias in some parts. Shrinking recharge zones, leaky infrastructure, and unregulated extraction underscore the urgent need for nature-based, inclusive solutions.

Steering the conversation towards the bigger picture, Ravi Chopra (People's Science Institute) emphasized that water cannot be compartmentalized as rural or urban but must be seen as a continuum shaping lives across regions. He stressed co-ownership in water management, where communities actively participate in decisions. His central argument: scientific insights must be communicated in accessible ways for collective decision-making. Nature-based solutions, rainwater harvesting, rooftop collection, and recharge zone protection, bridges - policy, science, and community action.

The session circled around big questions such as climate risks, drying springs, fragile urban water sources and practical fixes, from recharge ponds to remote sensing. What stood out was a shared belief in community-driven, nature-based solutions for reshaping Himalayan water futures.













DAY-02
Thursday
19th September

08.30 to 10.00

P-3

Day-02 Opening Plenary
Opportunities for Evidence-based Research

| Shilp Verma |

07.30 to 10.00

Field Trip #2
Climate Smart Gobar Value Chain
| Niraj Trivedi |

Field Trip #3
Solar Pump Irrigators' Cooperative
| Rahul Rathod |

10.30 to 13.00	14.30 to 16.00	16.30 to 18.00
T1-S3 Solar Enterprises and Entrepreneurs | Philip Kuriachen |	T1-S4 Solarizing Grid-connected Pumps | Rahul Rathod |	T1-S5 Mainstreaming Farmer-centric Agrivoltaics | Nikunj Usadadia |
T2-S3 Making Agriculture Aspirational | Suchiradipta Bhattacharjee |	T2-S4 Inland Fisheries in Transition | Philip Kuriachen |	T2-S5 Managing Water Risks and Productivity | Upali A. | Giriraj Amarnath |
T3-S3 Resilient, Water-Safe Communities | S. Krishnan | Lamnganbi Mutum |	T3-S4 Operationalizing *Atal Bhujal Yojana* (ABhY) | Suchiradipta Bhattacharjee |	T3-S5 Groundwater Governance | Suchiradipta Bhattacharjee |
T4-S1B Climate Resilience in Asia's Water Towers | R. Thadani | Arun Pandhi |	T4-S2 Towards Water Positive Municipalities | Deepa M.P.M. |	T4-S3 India's *Har Ghar Jal* Mission | Liby Johnson | Divyang Waghela |

Tea Break 10.00 to 10.30 || 16.00 to 16.30

Lunch Break 13.00 to 14.30

Conference Dinner | Venue: Neejanand Resort 19.30 to 21.30

P-3 Day-02 Opening Plenary

Opportunities for Evidence-based Research

Date: 19th September 2024 | **Venue: T.K. Patel Auditorium** | **Time: 08:30 – 10:00**

Custodian: Shilp Verma | **Chair: Mark Smith** | **Rapporteur: Deepa M.P.M.**

In partnership with Sustain Plus Energy Foundation (SPEF), IWMI-Tata Program's *SaatOrdi* pilot is field testing an entrepreneur-led village-scale biogas plant model that operates closely with women members of Ramdev Pir Sakhi Khad SahkariMandali (Women's Self Help Group). We are delighted to have with us Shri Gaurav Kumar Kedia, Chairman, Indian Biogas Association – to speak about the opportunities in India's Bioenergy economy.

As a program mandated with 'Converting Science into Policy Action', ITP has always strived to actively engage with young media professionals interested in water, energy, climate, agriculture, environment and rural livelihoods. Throughout ITP's history, this segment of our stakeholders has played a pivotal role in helping us convey field data, insights and results to policy makers. In this session, we bring together a group of such professionals to discuss the media-practitioner-policy interface and ways in which ITP and partners can better engage with them

From	To	Title	People
08:30	08:35	Welcome | Highlights from Day-01	
08:35	09:00	**Invited Keynote |** Opportunities in India's Bio Energy Economy	**Gaurav Kedia** Indian Biogas Association
09:00	09:45	**ITP CHAT | Lead: Shilp Verma** The Media-Practitioner-Policy Interface Aishwarya Tripathi | Rishika Pardikar | Sneha Richhariya	
09:45	10:00	Plan for Day-02 and Day-03	

The Media-Practitioner Interface and India's Bioenergy Sector

Shilp Verma | Deepa M.P.M.

The Day 2 opening plenary featured a keynote on India's bioenergy economy by Gaurav Kedia (Indian Biogas Association), followed by a panel on the media-policy-practitioner interface comprising of journalists Aishwarya Tripathi, Rishika Pardikar, and Sneha Richhariya. The plenary reflected on emerging avenues in the biogas sector discussed how best researchers, practitioners and the media can interact to share vital research, information and field insights.

Gaurav Kedia's keynote highlighted the cultural significance of cow-based resources in ancient India and their potential for contemporary sustainability. Central to his argument was a "nature-to-nature" philosophy emphasising circularity in resource use. Participants discussed how this approach could generate multiple benefits such as improved livelihoods, job creation and social inclusion. The conversation then turned to the typology of biogas plants in India. Participants noted that small-scale and community-based plants are designed less for profit and more for social impact, whereas large-scale plants, similar to European models, prioritize financial returns. Panelists highlighted that the adoption of biogas and bioenergy solutions depends not only on technical efficiency but also on the alignment of interventions with farmers' lived realities to avoid low uptake and unsustainable outcomes.

The plenary explored opportunities and challenges across the bioenergy value chain. Discussions emphasized the role of collaborative models for marketing byproducts such as organic manure, compressed biogas and carbon offsets. Innovative technology interventions, such as the *Gaay Addhaarith Unnati* app developed in collaboration with IIM Ahmedabad, were cited as examples of solutions that integrate environmental, social, and governance considerations. The app uses facial recognition to assess cow health, streamline insurance validation, and connect donors with animals.

The discussion then moved to the media-practitioner-policy interface. The panelists highlighted the challenges in covering policy interventions in an accurate, unbiased manner. Panelists stressed that community engagement is essential for sustainable reporting, and the need for reporters to move beyond superficial narratives and invest time in understanding contextual nuances, while researchers must provide credible, accessible evidence to support reporting. Participants debated the prevalence of climate washing and cautioned that media narratives must not obscure ineffective policies or misrepresent local realities. The discussion also emphasized the importance of communication between researchers, journalists and communities, and that findings should ideally be disseminated back to local populations in accessible formats and regional languages. The plenary concluded that robust partnerships between research institutions and media are vital to amplify impact, inform policy, and drive societal change.

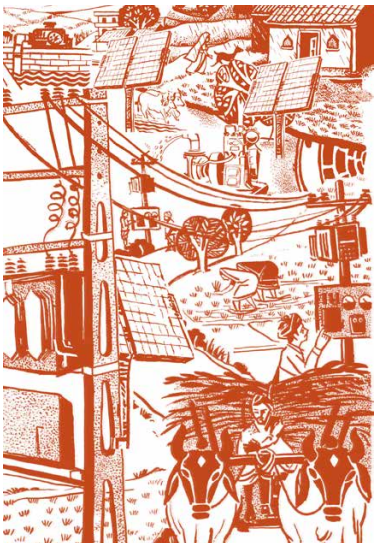
In his concluding remarks, Mark Smith (IWMI) reflected on the plenary's broader implications for research-for-development partnerships. He underscored that transformative change occurs at the interfaces of sectors, disciplines, and stakeholders, where technical, social, and market considerations converge. He also highlighted two key lessons from the session: first, the potential of circular economy approaches, exemplified by the Gobar Value Chain, to advance sustainability, promote rural livelihoods, and reduce environmental pressures; and second, the critical importance of collaboration between researchers and journalists to communicate evidence effectively, engage society, and ensure that interventions are responsive to local needs. He stressed that research must be inclusive and socially attuned, bridging local experimentation with broader systemic change and policy relevance.

T1-S3 Solar Enterprises and Entrepreneurs

Lessons from SE4RL and other Pilots

Date: 19th September 2024 | **Venue: Training Room #01** | **Time: 10:30 – 13:00**

Custodian: Philip Kuriachen | **Chair: Nilanjan Ghose** | **Rapporteur: Ganesh Pillai**



Off-grid solar pumps have expanded exponentially over the last decade. Solar pumps are expensive assets and are promoted with grant/subsidy support from government or non-government actors. Subsidized promotion targeting individual farmers is often characterized by low-capacity utilization, elite capture, and energy stacking. Solar irrigation enterprises and group irrigation schemes offering irrigation services to multiple farmers have been promoted as an alternative solarization model.

The session attempts to draw learnings from solar irrigation service models from across the country. What are the design features of these interventions? Are solar irrigation solar enterprises financially and economically viable? How does irrigation service fee influence capacity utilization? Can surplus energy from solar pumps be used for other productive uses?

From	To	Title	People
10:30	10:40	Status of Off-Grid Solar Pumps in India: SE4RL Benchmarking Study	Philip Kuriachen
10:40	10:50	IDCOL's Solar Enterprises in Bangladesh: A SWOT Analysis	Archisman Mitra
10:50	11:00	Oorja's Solar Irrigation Enterprises in eastern UP	Sejal Agarwal
11:00	11:45	**IDEAS FAIR | Moderator: Ayushi Uppal** **Experiments with Making Off-Grid Solar Pumps Viable and Affordable**	
		ITP's Variable Pricing Experiment with Oorja in UP	Laxmi Sharma
		FPO as Solar Irrigation Service Provider in Jharkhand	Ayan Deb
		Solar Pumps as a Micro-Enterprise for SHG Women in Bihar	Meenakshi Singh
		Kalike's experience with community solar pumps in Karnataka	Sai Srikanth
		PRADAN's experiments with solarizing LI schemes in Jharkhand	Manas Satpathy
11:45	12:00	ITP Keynote: The Future of Off-Grid Solar Pumps in India, and beyond	Philip Kuriachen
12:00	12:45	**PANEL DISCUSSION | Moderator: Nikunj Usadadia** Future of Off-Grid Solar Pumps in India **Panel: Avinash Kishore | Eshita Gupta | Apoorva Oza | Prerna Sharma | M. C. Buisson**	
12:45	13:00	Reflections and Closing Remarks	Nilanjan Ghose

Partners in Focus

Making Off-grid Solar Pumps Attractive for Farmers

Philip Kuriachen | Ganesh Pillai

Kicking-off the session, Philip Kuriachen (IWMI) presented results from the SE4RL benchmarking study in Uttar Pradesh, Bihar and Jharkhand. He reported that while revenue generation varied across locations, common impact indicators included reduction in drudgery and diversification to high-value crops. The annual operating hours were found to be highest among the entrepreneurs in Bihar, followed by Oorja's systems in Uttar Pradesh; with group systems in Bihar and Jharkhand reporting the lowest hours of operation. Another key parameter discussed was operation and maintenance of systems where community-owned systems reported higher downtime (up to 25 days) vis-à-vis Oorja's systems (3 days).

Archisman Mitra (IWMI) presented a SWOT analysis of the Infrastructure Development Company Limited (IDCOL)'s fee-for-service model in Bangladesh. Here, the study found that irrigation costs were 20-30% lower compared to diesel pumps and that the model self-targets regions with high irrigation demand. He argued that aggregation of demand and deployment in large numbers offered significant economies of scale and led to speedy implementation. On the downside, the model may encourage domination by a few companies. He also argued that the existence of an NGO or private company willing to take on the enterprise was a pre-requisite for the success of the model. Rising price of diesel offered a significant opportunity for the systems while expansion of the rural electricity grid might become a threat.

Sejal Agarwal (Oorja) shared 'irrigation as a service' model where irrigation is sold using volumetric pricing and Oorja's attempts for utilizing surplus solar energy for agro-processing applications such as milling. She also spoke about ITP's 'variable pricing experiment' where the unit price was reduced to half, leading to a 111% increase in utilization and an overall 6% increase in volume of sales. Sejal also spoke about Oorja's new B2B2C model as a new avenue for scaling solar irrigation service provision.

The presentations were followed by brief interventions about various efforts and field experiments for making off-grid solar pumps viable and more affordable. Manas Satpathy (Professional Assistance for Development Action, PRADAN) spoke about deploying more than 500 solar pumps in Jharkhand with farmers – organized into farmer producer organisations (FPOs) – contributing 10% of the capital cost. The model significantly reduced out-migration and doubled farmers' annual income. He argued that group irrigation encourages efficient water use – but requires continuous community engagement. Meenakshi Singh (AKRSP-I) shared work offering solar pumps as micro-enterprises to SHG women in Bihar. She explained how AKRSP-I worked with RangDe for low interest loans to cover initial investment; and how repayment of this loan created incentives for the women entrepreneurs to maximize pump utilization. Ayan Deb (SPEF) shared the FPO-led model of solar irrigation implemented with CInI in Jharkhand where investment in solar pump is embedded as one of the enablers in the larger agricultural value chain. Sai Srikanth (Kalike) spoke about 200 solar pumps deployed in Karnataka through a 10-40-50 grant-equity-loan model, under their community irrigation model leveraging soft loans to ensure financial inclusion. He explained that following a series of workshops with financial institutions, Kalike was able to rope-in SBI to provide loans to farmers. Here too, loan repayments encourage efficient and maximum utilisation of the pumps, but with a check on the promotion of water-intensive crops. Laxmi Sharma (Indian Council for Research on International Economic Relations, ICRIER) shared details of ITP's variable pricing experiment with Oorja. She argued for the need for more such experiments to help maximise efficient utilization of off-grid solar pumps.

Discussion on the future of off-grid solar pumps covered themes such as the need for management of groundwater extraction through proper institutional mechanisms. It was argued that more data was required on the impact of various business models on groundwater pumping; and better incentives were needed to encourage efficient groundwater use. It was also recognized that through buyer-friendly irrigation service markets, water lords were being replaced by irrigation groups or entrepreneurs – reducing irrigation cost not only for pump owners but also for water buyers. Session chair, Nilanjan Ghose (GIZ) summed the '3D' impact of solar pumps by way of Decarbonization, Decentralization and Digitization.

T1-S4 Solarizing Grid-connected Pumps

Lessons from India's pioneering experiments

Date: 19th September 2024 | **Venue: Training Room #01** | **Time: 14:30 – 16:00**

Custodian: Rahul Rathod | **Chair: Deepak Gupta** | **Rapporteur: Nikunj Usadadia**

In 2015-16, ITP implemented the world's first grid-connected solar irrigation pump as part of its SPaRC (Solar Power as Remunerative Crop) pilot. ITP's innovative experiment in Thamna and later in Dhundi was replicated in *Mujkuva* by NDDB and became the inspiration for Gujarat's Suryashakti Kisan Yojana (SKY). It was also adopted as one of the three key components in the Ministry of New and Renewable Energy's (MNRE) ambitious Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) campaign. Experiments with grid-connected and SPaRC-enabled solar pumps have also been implemented in Karnataka, Andhra Pradesh and most recently Rajasthan. The model has also been piloted in Bangladesh and Nepal.

Despite its various co-benefits, SPaRC has not taken-off as rapidly as we had anticipated. What can we learn from all these experiments and what is the future of grid-connected solar pumps? How can grid-connected solar pumps be implemented as instruments for groundwater governance? Join us to discuss some of these key policy questions

From	To	Title	People
14:30	14:40	**ITP Keynote** The case for grid-connected solar pumps: Evidence from Gujarat's *Suryashakti Kisan Yojana*	Rahul Rathod
14:40	14:50	Impact of SKY Implementation on Water Markets	Sonal Bhatt
14:50	15:10	**FIELD INSIGHTS | Moderator: Nikunj Usadadia** **Experiments with Grid-Connected SIPs**	
		Karnataka's *Surya Raitha* experiment	A.V. Manjunatha
		Lessons from Andhra's BLDC pilot	Ranjit Chandra
		SPaRC-enabled Pilots in Bangladesh	Archisman Mitra
		SPaRC-enabled Pilots in Nepal	Shisher Shreshtha
15:10	15:30	**ITP-TNC Action Proposal** Unlocking Punjab's Water-Energy-Food Nexus	Tushaar Shah **Discussants:** Gyan, Ganesh
15:30	15:50	**ITP-VCF Action Proposal** Piloting SPaRC-enabled solar pumps in Telangana	Chandrika / Devyani **Discussant:** A. Choudhary
15:50	16:00	Reflections and Closing Remarks	Deepak Gupta

Partners in Focus

SUSTAIN+ The Nature Conservancy

Unlocking the Potential of Grid-connected Solar

Rahul Rathod | Nikunj Usadadia

Rahul Rathod (IWMI) set the scene by ITP research on Gujarat's innovative scheme for agri. solarization, Suryashakti Kisan Yojana (SKY). Inspired by ITP's pilot in Dhundi, SKY has solarized more than 4,000 agricultural tubewells across more than 90 agricultural feeders in Gujarat. Rahul argued that SKY's relaxation in farm power rationing somewhat diluted the strength of the incentives for efficient energy use offered by SKY. He also showed how selling water was more lucrative for farmers than selling energy, especially in water-abundant regions, and still, more than 60% of SKY farmers evacuated enough power to repay the loan covering 65% of the capital cost of their solar systems over seven years. SKY data suggests high statistical significance of the scheme's behavioural impact. The presentation by Sonal Bhatt (Sardar Patel University) also highlighted the trade-off between selling water and energy in SKY. She argued that the trade-off becomes more pronounced when farmers' electricity bills are due, leading them to hike water rates, reduce irrigation, and limit sales – affecting water buyers. She argued that higher feed-in-tariff can help offset rising water rates by encouraging farmers to shift from water to power sales; this could also reduce inefficient water use.

The moderated panel that followed showcased insights from grid-connected solar experiments from Karnataka, Andhra Pradesh, Bangladesh and Nepal. In a video message, A.V. Manjunatha (Institute for Social and Economic Change, ISEC) shared experience of Karnataka's Surya Raitha pilot and reported about 8% increase in the income of participating farmers. Ranjit Chandra (En-genuity) found the local hydrology and crop water requirement not aligned with the pilot design; he reported monthly income of INR 1,200 (approximately USD 13.5) to be unattractive for participating farmers in Andhra Pradesh's BLDC pilot. Sharing challenges faced in grid-connected solar pump piloted in Bangladesh, Archisman Mitra (IWMI) spoke about load shedding, theft of transformers, high discharge rate of pumps and drying of borewells. Nepal too experimented with grid-connecting solar pumps with 8 participating farmers, shared by Shisher Shreshtha (IWMI). He noted that in the Nepal experiment, net billing limited the encashment of units fed to grid and a farmer could inject only 90% of the units s/heconsumed. Challenges mentioned includedpoor voltage, inverter burn-out, and day-time load distribution. He concluded that the experiment helped water buyers to get water at lower tariffs.

The ITP-TNC action proposal presented by Tushaar Shah (IWMI) pitched for solarization of 180-200 tubewells through net-metering and a 25-year power purchase agreement with farmers. In Punjab, the model proposed 2X over-sizing (2 kWp solar array per kW of pump capacity) and a 30:30:30 ratio of contributions from Government of India, Government of Punjab and TNC-SPEF; with farmers contributing 10% upfront. It also proposed a Telescopic Tariff based on number of surplus units evacuated. The ITP-VCF (Vijayavahini Charitable Foundation) proposal presented by Chandrika and Devyani (IRMA) shared estimates for solar energy generation and pump operations and analysed alternate models for solarization in Telangana, where heavily subsidized 24*7 farm power supply to farmers has been bankrupting electricity utilities.

The closing remarks by session chair, Deepak Gupta (National Solar Energy Federation of India, NSEFI) noted that proper maintenance, grid reliability and billing concerns were the key challenges faced by states in implementing grid-connected solar pumps. He also pointed that while higher feed-in-tariffs will make grid-connected solar more attractive for farmers, declining unit costs of solar and grid-parity concerns can make it difficult for DISCOMs to offer higher tariffs. He concluded that ITP's innovative proposals can act as driving force for the revival of interest in individual pump solarization.

T1-S5 Mainstreaming Farmer-centric Agrivoltaics

Doing it Right, for the Right reasons, and with the Right approach!

Date: 19th September 2024 | **Venue: Training Room #01** | **Time: 16:30 – 18:00**
Custodian: Nikunj Usadadia | **Chair: Deepak Gupta** | **Rapporteur: Ashwitha Thunga**

In simple terms, Agrivoltaics is the co-generation of food and solar energy on the same piece of land. There's a growing recognition of the opportunities that agrivoltaics offer for India, with several public and private sector players learning from global experiences and investing in field testing alternative designs. While the country is much ahead of much of the developing world, most of the designs tested so far have been optimized for photovoltaic (PV) output, with Agri being an afterthought. This is not surprising because of the huge imbalance between the value of energy and agri output.

The current models of agrivoltaics would appeal to farmers with marginal lands who want to get rid of farming. It offers farmers an additional income from land rent and perhaps some free power and in rare cases, possibility of work outside farming. However, there can be another approach to agrivoltaics that maintains better balance between the value of PV and agri. output. This would mimic the high value agriculture practices underneath panels in Europe and Japan and build more stakes for farmers in the success of the enterprise. Such an approach is also likely to appeal more to government initiatives such as PM-KUSUM where the primary focus is on farmer welfare, and not just on expanding solar generation capacity.

With support from IKI, IWMI India has partnered with GIZ and Fraunhofer ISE to launch a new initiative on agrivoltaics. This session outlines the mandate of this new initiative and explores opportunities for collaborative research and field action.

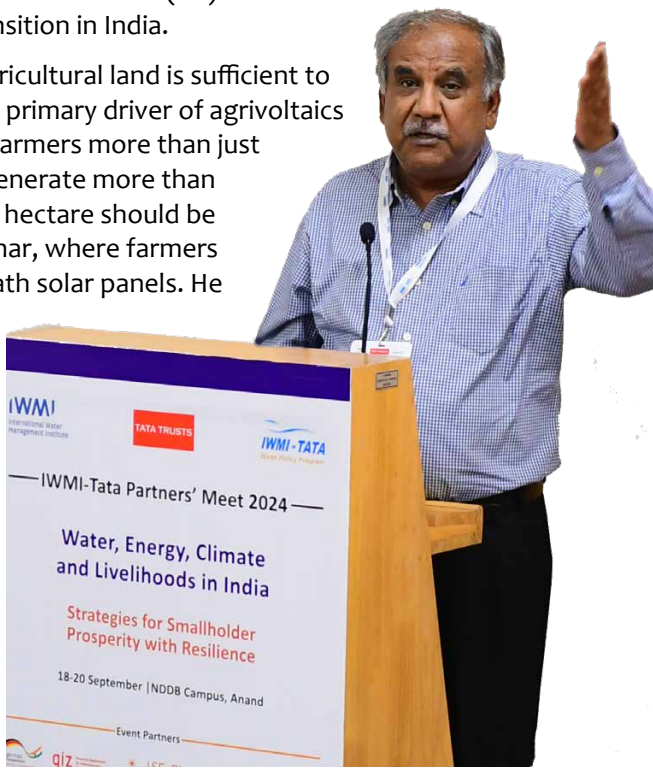
From	To	Title	People
16:30	16:40	Indo-German Cooperation on Agrivoltaics (IGCA)	Florian Postel
16:40	16:50	**ITP Keynote** The *Why*, *What*, *Where* and *How* of Synergistic Agrivoltaics	Nikunj Usadadia
16:50	17:50	**MODERATED CONSULTATION | Moderator: Nikunj Usadadia** Making Agrivoltaics Attractive for Farmers **G. Girase | Deepita Saxena | Ashok Kumar | Ganesh Neelam**	
17:50	18:00	Reflections and Concluding Remarks	Deepak Gupta

Partners in Focus

The Promise of Farmer-centric Agrivoltaics

Nikunj Usadadia | Ashwitha Tunga

Florian Postel (GIZ) provided an overview of a new initiative, 'Indo-German Cooperation on Agrivoltaics' (IGCA) with Fraunhofer ISE and IWMI India, with support from the International Climate Initiative (IKI). IGCA aims for increased uptake of agrivoltaics and the acceleration of just energy transition in India.



In his presentation, Nikunj Usadadia (IWMI) argued that 1% of India's agricultural land is sufficient to meet India's 2030 solarization target; hence land scarcity cannot be the primary driver of agrivoltaics in India. He also argued that farmer-centric business models that offer farmers more than just 'fair rentals', where the plant design is driven by agriculture, and that generate more than INR 130,000 (approximately USD 1,470) annual agricultural revenue per hectare should be promoted. He also shared field data from small solar pumps in north Bihar, where farmers are – without any external nudge – practicing crop cultivation underneath solar panels. He concluded by posing some questions for the panel.

Gulabsing Girase (GroSolar) argued that agrivoltaics is not cost-prohibitive, as is normally assumed, and that it can be done with as little as 1-2% additional cost vis-à-vis ground-mounted systems. The incremental cost of agrivoltaics over ground-mounted solar should be more than compensated by the additional benefits that it offers, and therefore, adoption of agrivoltaics should not be dependent on any viability gap funding (VGF) or subsidies. Sharing experience of 100 KVK-led awareness workshops, Deepita Saxena (GIZ) spoke about the enormous interest shown by farmers and highlighted some of their concerns and queries.

Ashok Kumar (Transform Rural India) and Ganesh Neelam (Sustain Plus Energy Foundation) highlighted their interest in and plans for implementing farmer-centric agrivoltaics, with a strong focus on smallholder livelihoods and active participation of women farmers. The need for clarity on classification of dual-use land as agricultural or commercial – and its implications for taxes, access to subsidies, and credit – was also highlighted. Also suggested was the inclusion of PV waste management in the framing of policies and regulations around agrivoltaics.

The session chair, Deepak Gupta (NSEFI) re-emphasized the importance of scaling solar deployment, and the role that agrivoltaics can play in helping India achieve this. He urged organizations to work together and collaborate to deliberate and address issues in current policies under PM-KUSUM.

T2-S3 Making Agriculture Aspirational

Lessons from ITP's SFPF Initiative

Date: 19th September 2024 | **Venue: Training Room #03** | **Time: 10:30 – 13:00**

Custodian: Suchiradipta B. | **Chair: Dhruvi Shah** | **Rapporteur: Oorna Raut**

The average monthly income for an Indian farm family is less than $120. In poorer states like Jharkhand, this falls to below $50, with some earning as low as $10 per month. Even factoring for Purchasing Power Parity, this level of poverty is hard to imagine and excruciating to endure. The core of ITP's mandate revolves around the design of effective programs and policies for enhancing rural livelihoods. More than a decade ago, in 2012, ITP started the 'Small Farmer, Prosperous Farmer' (SFPF) initiative by asking a few simple but important questions. Will Indian agriculture continue to be the parking lot of the poor? Are smallholders forever doomed to a life of poverty and deprivation, or can smallholder agriculture become aspirational? What can livelihood programs and policies learn from the outlier prosperous farmers that we keep reading and hearing about? Do these Krishi Rishis do completely different things, or do they do the same things differently?

In over 40 cases from across the country, ITP found instances of cohorts of small farmers who managed to break out of poverty and debt traps and earn more than their counterparts who chose to migrate to city-life, above USD 400 per month. The studies and a provisional synthesis were discussed at the 2018 ITP Partners' Meet. Over the last year, ITP partnered with Sanjiv Phansalkar to revisit and rewrite some of these cases and compile the lessons into a Compendium of Smallholder Prosperity. Come join us to discuss and contribute to this important piece in ITP's research portfolio.

From	To	Title	People
10:30	10:45	ITP Keynote: SFPF's key insights for program design and policy formulation	S.J. Phansalkar, Suchiradipta B.
10:45	11:00	SFPF In Action: CInI's *Lakhpati Kisan* Program	Ganesh Neelam
11:00	11:50	**PANEL DISCUSSION | Moderator: Suchiraqdipta B.** Redesigning Programs and Rethinking Policies **Panel: Ashok Kumar | Saravanan Raj | Dev Paikaroy | Ashima Chaudhary**	
11:50	12:00	Introducing the SFPF Training Program	Sanjiv J. Phansalkar
12:00	12:50	**PANEL DISCUSSION | Moderator: Suchiraqdipta B.** Identifying Catalysts and Reimagining Capacities **Panel: Nimisha Mittal | Nitin Puri | Shambu Prasad | Nikhil Mathur**	
12:50	13:00	Concluding Remarks	Dhruvi Shah

Partners in Focus

Blueprint for a Greener Future

Suchiradipta Bhattacharjee | Oorna Raut

The session revisited ITP's SFPF initiative, discussing the key similarities between 'prosperous' farmer case studies: a mindset towards intensive farming, diversification, a focus on early lifecycle products like seeds, a strong ecosystem (market linkages, inputs, secure land and water), and more. It drew on practical experiences from CInI's Lakhpati Kisan Program, taken as an example of SFPF in action. The discussion that followed considered the parameters and constraints to identifying smallholder prosperity pathways in the diverse and complex agriculture landscape in India.

Participants discussed how farmers, especially youth, are less inclined towards pursuing agriculture. Saravanan Raj (National Institute of Agricultural Extension Management, MANAGE) emphasised the need to reimagine farming as entrepreneurial and technology-enabled, supported by robust ecosystems and infrastructure, and to provide farmers with more exposure and opportunities. Agriculture remains a non-aspirational avenue for youth unless systemic barriers are addressed and successful role models are identified.

Speakers pointed to the tension between scaling and local specificity. While big-picture frameworks are useful, scaling must account for agroecological diversity, institutional variation, and socio-economic realities. Shambu Prasad (IRMA) pointed to the difference between 'understanding the big picture' and scaling, mentioning how models like ODOP (One District One Product) may inadvertently restrict farmer diversification. He continued: "The value of detailed case studies is to highlight what's happening in the external environment... Today, we even see NRLMs (National Rural Livelihood Missions) asking how self help groups can become unicorns – but they were not created for that model. You cannot recreate Amul for all commodities. Ecosystem designs will have to vary. What we need are better designs that give more choices to farmers, as public policies and existing ecosystems are currently restricting this." Participants noted that effective and equitable models require long-term engagement, often 7 to 10 years, and must be grounded in local realities. One approach could involve showcasing local success stories or 'islands of excellence' and building training ecosystems around them to inspire and educate other farmers.

Program design must account for social equity and intersectionality, noted the participants, and consider caste, gender, access to land, and local hierarchies – which most government schemes fail to adequately consider these factors. Ashima Chowdhury (WELL Labs) emphasised the long-term value in delinking farm incentives from land ownership and embedding equity into policy and program design.

Participants reflected on the differential market, institutional, and informational gaps faced by smallholders. While cooperative marketing was seen as a way to enhance price control and income stability, its success remains uneven. Discussions around organic farming noted that despite its productivity, farmers often face high input costs and weak price realisation. Participants also discussed the critical role of agricultural extension workers, who are often under-resourced but key to enabling transitions towards prosperity.

The session concluded with reflections on the broader challenges and strategic directions for farmer prosperity initiatives. It was suggested that efforts could be focused on strengthening support for youth who choose to remain in farming. Markets were noted as playing a significant role in shaping outcomes for smallholders, highlighting the need for policies and programs to better engage with them. Finally, the importance of collaboration among CSOs was underscored, especially in sharing training materials, experiences, and lessons learned. There was a call for CSOs to collectively communicate to funders the real requirements for long-term impact, and to help build greater understanding within the funding community about what is needed to support sustained, meaningful change in the agriculture sector.

T2-S4 Inland Fisheries in Transition

Opportunities for Marginal Farmers

Date: 19th September 2024 | **Venue: Training Room #03** | **Time: 14:30 – 16:00**

Custodian: Philip Kuriachen | **Chair: Arun Padiyar** | **Rapporteur: Arnab Paul**

Fisheries sector in India has witnessed a paradigm shift from marine to inland fisheries over the last four decades. Inland fisheries now account for more than 70 percent of the annual production. Ponds and tank aquaculture are the principal contributors to culture-based fishery programs. Fish Farmers Development Agencies (FFDAs) and civil society organization have initiatives promoting aquaculture. These initiatives have significantly enhanced aquaculture productivity. However, the equity impacts of these activities on traditional fisherfolk remain understudied.

This session seeks to draw lessons on small holder prosperity from culture fisheries promotion initiatives by government, non-government actors and private entrepreneurs. How has aquaculture promotion impacted the livelihoods of traditional fisherfolk? What are the institutional constraints that has affected the viability of pond aquaculture? What are the constraints in intensification and productivity increase in open-source fishery?

From	To	Title	People
14:30	14:40	**Invited Keynote** | Class Gains in Fisheries Management in India	Jharna Pathak
14:40	14:50	**Invited Keynote** | Collectives for Aquaculture Promotion	Subodh Kumar
14:50	15:00	**ITP Keynote** | Making Inland Fisheries work for the Poor	Philip Kuriachen
15:00	15:50	**PANEL DISCUSSION | Moderator: Philip Kuriachen** Poor-Friendly Aquaculture Value Chains **P. Chaturvedi | Sai Srikanth | D. Panda | N. Barik | *Shashwati Bhunia* | R. P. Sakhreliya**	
15:50	16:00	Session Chair's Reflections	Arun Padiyar

Partners in Focus

Policy, Practice, and Opportunities in Smallholder Fisheries

Philip Kuriachen | Arnab Paul

The session moved beyond sectoral trends to deliberate on how culture-based fisheries promotion has played out for marginal farmers and traditional fisherfolk. Discussions highlighted how leasing policies, fingerling quality, and access to productive water bodies have shaped outcomes. The dialogue emphasized the tension between policy intentions and field realities, examining opportunities created through pond-based aquaculture and the institutional bottlenecks limiting equitable benefits.

The session opened with Jharna Pathak's (Gujarat Institute of Development Research) presentation. Her analysis of Ukai in Gujarat and Gandhisagar in Madhya Pradesh sparked discussion on the uneasy fate of fisheries co-operatives. Originally designed for empowerment, they have morphed into revenue generating mechanisms, leaving fishers sidelined. While participation can enhance income, education and reservoir conditions largely dictate benefits. Striking was her claim that many fishers are reduced to wage labourers within a system meant to empower them, a paradox that fuelled debate.

The session picked up momentum with Subodh Kumar's (Jaljeevika) presentation on sparking discussion on why fishery-based livelihoods struggle despite multiple initiatives. The conversation centered on challenges beyond production—limited credit, weak technical support, and poor market linkages keep small producers on the margins. Subodh showcased how the Jal Jeevika program addresses these gaps by strengthening organizations, training master trainers, and leveraging IT-enabled extension. Participants considered the future, discussing gender mainstreaming, scaling digital innovations without losing relevance, and whether integrated aquatic livelihoods, including allied activities, could provide sustainable prosperity for marginal farmers.

The session then moved to Philip Kuriachen's (IWMI) presentation, steering the discussion toward practical aspects of aquaculture. Philip outlined Gujarat's village pond lease policy, showing how open auctions promoted aquaculture even in non-traditional areas. The discussion highlighted challenges of poaching, declining water quality, and seasonal water scarcity. Participants engaged on how bid values are determined, noting they depend on pond size, depth, water availability, quality, and social risks. Insights underscored the interaction of policy, incentives, and local realities. The presentation emphasized that making fisheries work for marginalized communities requires adaptive approaches and balancing environmental and social factors.

The panel discussion, moderated by Philip Kuriachen (IWMI), brought together to explore inland fisheries realities. Panelists shared experiences of integrating fisheries into village tanks, generating revenues for upkeep, while household ponds under the "farm pond scheme" showed limited success. Challenges like summer water scarcity and weak market linkages were highlighted, particularly in Dangs, where collective marketing and B2B sales to hotels improved price realization. PRADAN's work integrating fisheries within watershed interventions was discussed, including trials of using yearlings instead of fingerlings for shorter cycles. A recurring concern was poor fingerling quality, prompting calls for decentralized seed production as a micro-enterprise for smallholders.

Overall, the session underscored that cooperatives have largely failed to safeguard fisherfolk due to design limitations, while fingerling quality remains a critical bottleneck that can be addressed through micro-enterprise production by promoting decentralized hatchery units. Integrated agriculture aquaculture systems emerged as a potential alternative, particularly in Eastern India, capable of meeting rising fish demand while enhancing livelihoods.

T2-S5 Managing Water Risks and Productivity

Applying Tools for Program Planning and Design

Date: 19th September 2024 | **Venue: Training Room #03** | **Time: 16:30 – 18:00**

Custodian: Upali A | Giriraj A. | **Chair: Alok Sikka** | **Rapporteur: Vidya Mandave**

As we prepare for this session, close to 2 million people are facing the wrath of floods in Assam, Manipur and Tripura. There is growing consensus that with climate change, the intensity and frequency of such extreme climate events will increase. This would mean more frequent and more severe droughts in some parts of the country and more devastating floods in others.

A key aspect of building the climate resilience of communities pertains to helping them cope better with such extreme events.

In this session, we showcase some of IWMI's work on managing water risks – Index-based Flood Insurance (IBFI) in north Bihar, a framework for Drought-proofing ITC Limited's agri-catchments, and decision support tools such as the Water Productivity Atlas. Join us in Anand to explore how grassroots organizations can leverage this work and such analytical tools for prioritization of interventions and design of field programs.

From	To	Title	People
16:30	16:40	IWMI's Experiment with Index Based Flood Insurance (IBFI) in North Bihar	Giriraj Amarnath
16:40	16:50	Applying the Water Productivity Atlas for Prioritization and Program Planning	Upali Amarasinghe
16:50	17:00	WAT-NRM Drought Proofing Tool for Planning Livelihood Interventions	Sudharsan Maliappan
16:50	17:50	**MODERATED CONSULTATION | Moderator: Shreya Chakraborty** Deploying Tools for Cluster-Level Intervention Planning **Panel: Vijay Vardhan | Eklavya Prasad | Pankaj Papnoi**	
17:50	18:00	Concluding Remarks	Alok Sikka

Partners in Focus

Digital Tools for Planning Natural Resource Management Interventions

Upali Amarasinghe | Giriraj Amarnath | Vidya Mandave

The session explored how digital tools and analytical frameworks can strengthen water management and agricultural planning. Emphasis was placed on balancing scientific data with ground realities to ensure context-specific interventions.

The session kicked off with Giriraj Amarnath's (IWMI) presentation, highlighting how satellite technology is transforming flood risk management for farmers. Index Based Flood Insurance (IBFI) leverages remote sensing and computer models to deliver rapid compensation directly to affected farmers' bank accounts. Participants explored the 7-step IBFI workflow, from monitoring water levels to calculating flood depth, risk, and crop losses. Discussion expanded to other tools, such as SADMS, EO4AI, GeoGoviya, AWARE, AgRISE, and AgData Hub Zambia, illustrating digital platforms' potential in managing climate-induced risks.

Building on digital tools and risk management, Upali Amarasinghe's (IWMI) presentation on highlighted how water productivity and footprint indicators guide smarter agricultural decisions. Participants explored the Atlas's physical, economic, and nutritional metrics, along with blue and green water footprints at district and sub-basin levels. Case studies from the Ganges Basin highlighted contrasts between water-rich and water-stressed regions, revealing inefficiencies and overuse of groundwater. Discussions focused on crop-specific water use, energy implications, and crop diversification in Ambala district, showing potential to reduce groundwater footprints while boosting returns. The Atlas supports identifying hotspots, guiding investments, and analysing trade-offs in the water-energy-food nexus.

From mapping water productivity to planning actionable interventions, the session turned to Sudharsan Maliappan's (IWMI) presentation on the Traditional basin-level models like SWAT (Soil and Water Assessment Tool) and WEAP (Water Evaluation and Planning System), though rigorous, remain inaccessible due to high data, costs, and processing demands. The Watershed Analysis Tool for Natural Resource Management (WAT-NRM) bridges this gap by providing a simple platform to evaluate water balance, recommend context-specific agricultural interventions, and assess potential impacts under current and future climates. Case examples from four watersheds in Telangana showed supply- and demand-focused interventions enhancing resilience. Attendees debated usability, integration with other tools, and translating insights into field-ready strategies supporting sustainable watershed development.

The panel discussion on explored challenges and opportunities in using digital tools for field-level interventions. Vijay Vardhan (ITC Limited) emphasized simplification, showing how ITC, with IWMI, implemented a drought-proofing tool across 157 watersheds in Karnataka, adapting it for field workers and using voice messages for farmers who cannot type. Vinod Kothari (Himmotthan Society) noted CSOs face short timelines, usually three years, and questioned who maintains the tools, suggesting Panchayats could fund and manage them. Eklavya Prasad (Megh Pyne Abhiyan) highlighted NGOs' role in local nuances, including flood types, and ensuring fair compensation for landless farmers in north Bihar. Pankaj Papnoi (Centre for Microfinance, CMF) shared MIDAS experiences, stressing balance between accuracy and usability.

The session, chaired by Alok Sikka (IWMI), concluded emphasizing practicality: digital tools aid decision making, but there must be balance between scientific data and ground realities. Tools should be simplified for easier NGO and private organization use to foster ownership and impact. Speakers stressed building trust, co-designing with communities, and integrating feedback as critical. Digitization's potential emerges when technology aligns with human engagement, local insights, and context-specific needs, enabling tools to support resilient and informed interventions.

T3-S3 Resilient Water-Safe Communities

Mapping Criticality of Water Quality to Rural Livelihoods

Date: 19th September 2024 | **Venue: Training Room #04** | **Time: 10:30 – 13:00**

Custodians: L. Mutum | S. Krishnan | **Chair: Anuj Sharma** | **Rapporteur: Suneetha Sapur**

The impact of poor water quality extends beyond drinking water and through it, its impact on human health. It has been argued that water pollution is a silent saboteur of our economy's agricultural backbone. Research has shown that contaminants can alter soil pH, nutrient availability, and microbial activity, leading to soil degradation and reduced productivity. In some regions, farmers engaged in aquaculture are acutely affected through reduced productivity and higher costs. Past work, including some by ITP and INREM Foundation, has established that poor water quality can have debilitating effects and a key driver of the severity of these effects is nutrition. However, the impact of water quality on livelihoods remains poorly documented and understood.

Earlier this year, ITP and INREM Foundation engaged with multiple partner organizations with a view to undertake a collaborative multi-location mapping of the socio-economic impact of poor water quality on rural communities, particularly rural livelihoods. One long-term objective of this exercise is to explore the need to co-create and develop training and capacity-building programs that would be relevant for implementing organizations. This session shares the results of our early exploration and highlights the need to build water safe communities for sustainable livelihoods.

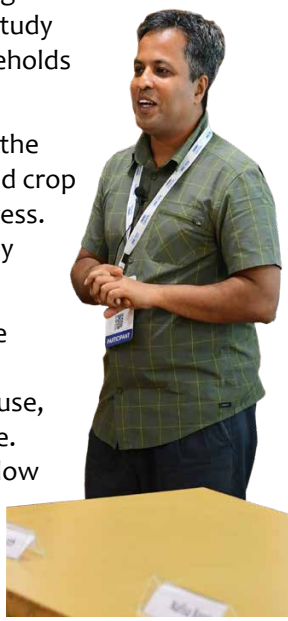
From	To	Title	People
10:30	10:50	**ITP-INREM Keynote |** Water Quality and Rural Livelihoods	S. Krishnan / Lamnganbi Mutum
10:50	11:20	**Field Insights | Moderator: Sunderrajan Krishnan** What do we Know? **Suneetha Sapur | Arvind Singh | Niti Saxena**	
11:20	11:30	Wastewater Use in Agriculture	Alka Palrecha
11:30	12:20	**MODERATED DISCUSSION | Moderator: Sunderrajan Krishnan** Water Quality and Rural Livelihoods Panel: Nafisa Barot | Eklavya Prasad | S. Vishwanath	
12:20	12:50	Open Discussion | Q&A	
12:50	13:00	Concluding Remarks	Anuj Sharma

Partners in Focus

Water Quality and Rural Livelihoods Interface

Lamnganbi Mutum | S. Krishnan | Suneetha Sapur

The session examined the intersections of water quality, agriculture, and rural livelihoods, moving from field-based evidence to policy debates. Opening the session, Sunderrajan Krishnan (INREM Foundation) and Lamnganbi Mutum (IWMI) underlined the connection between livelihoods and water quality. Their water quality study across nine states revealed that while awareness of water quality issues is widespread, few rural households actually test their water sources, and training in waste management or purification remains limited.



Field insights from Nalgonda, Telangana, presented by Suneetha Sapur (INREM Foundation), revealed the yield disparities between canal-irrigated and groundwater-irrigated areas, policy shifts that have altered crop patterns and reduced cultivated land, and growing out-migration linked to water-related agrarian distress. These challenges were found to be compounded by health problems emerging from poor water quality and farming practices.

The discussion then turned to wastewater in agriculture. With only 1600 MLD of the 6600 MLD sewage generated in Indian cities treated effectively, as Alka Palrecha (People in Centre) noted, untreated wastewater dominates irrigation flows. Municipalities have struggled to operationalize wastewater reuse, and even where treatment plants exist, bypassing them is common. Yet, farmers continue to improvise. They often treat wastewater through natural methods like settling tanks and protective gear, and its flow through natural drainage systems also aids self-cleaning, making it safer for irrigation. Punjab stands out as the only state where wastewater irrigation is formalized through safety plans and irrigation department oversight.

In the panel discussion that followed, Nafisa Barot (Utthan) reminded participants that India's water crisis has been ongoing for four decades, often framed in terms of equity and technical fixes but rarely backed by meaningful protection of resources. Participants stressed the need to recognize anthropogenic pressures on livestock health. Eklavya Prasad (Megh Pyne Abhiyan) noted that while links between water and human health have been recognized for nearly two decades, they remain poorly understood in practice. They also called for systematic assessment of drinking water quality across rural, urban, and peri-urban contexts. Further, Vishwanath S. (Biome Environment Trust) situated the discussion in the 'One Health' framework, which integrates human, animal, and environmental health. He argued that such a framing requires strong institutional support and practical interventions, and that programs like the *Jal Jeevan Mission* can explicitly account for livestock needs.

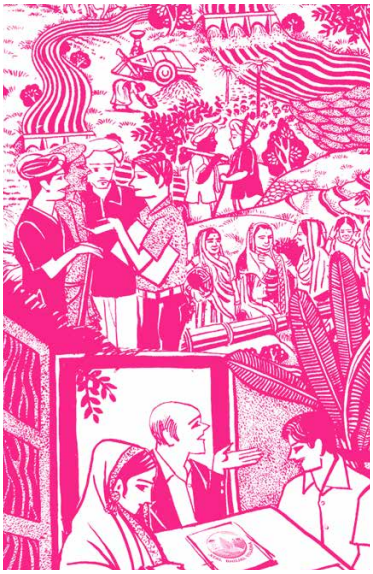
Participants argued for an ecosystem approach to water governance that links access and quality, with a gender-transformative lens. Liby Johnson (Gram Vikas) called for an equity focus within Integrated Water Resource Management, cautioning against privileging advantaged groups, and proposed the creation of grassroots-relevant water quality indices. Others mentioned the urgency of raising awareness on water issues, practical challenges with plastic lining use in farm ponds, and the need for state involvement to address water quality issues in agriculture and livestock.

The chair drew together the diverse threads of the discussion, emphasizing that water quality debates cannot be reduced to technical or localized fixes alone. They must account for equity, institutional responsibility, and the interconnections between human, animal, and environmental health. The lack of accountability for protecting water resources, they noted, remains a central gap. The session closed with a set of key takeaways: water quality must be addressed as both an ecological and governance challenge; wastewater reuse requires institutional innovation and not just treatment capacity; awareness must be matched with accessible testing and training; and approaches like "One Health" and gender-sensitive management provide critical pathways for integrating livelihoods, health, and resource equity.

T3-S4 Operationalizing *Atal Bhujal Yojana*

Date: 19th September 2024 | **Venue: Training Room #04** | **Time: 14:30 – 16:00**

Custodian: Suchiradipta B. | **Chair: Himanshu Kulkarni** | **Rapporteur: Garima Taneja**



Participatory Groundwater Management (PGWM) has existed in India for quite some time with variable success. The success stories have inspired policy makers to include in the National Water Policy (NWP) of 2002 an emphasis on "participatory water resource management by involving government agencies, users and other stakeholders" across the policy process. NWP 2012 introduced the idea of managing groundwater as a community resource.

The *Atal Bhujal Yojana* (ABhY) scheme of 2020 brings these ideas to a comprehensive policy for sustainable groundwater management. The scheme recognises groundwater as a common pool resource (CPR). Its core emphasis is community participation and decentralised governance to achieve long-term sustainability of groundwater resources, particularly in stressed areas. ABhY embodies the idea of participatory groundwater management through water budgeting and community-led water security plans but goes beyond that to bring in scientific knowledge by integrating seven related departments. Convergence in design and implementation thus becomes another important aspect of the scheme. This session would be a platform to deep-dive into these aspects with stakeholders from across the board.

From	To	Title	People
14:30	14:40	**ITP Keynote | *Atal Bhujal Yojana* (ABhY): Daunting Task and Miles to Go…**	Suchiradipta B.
14:40	14:50	Video | Convergence Opportunities between PM-KUSUM and ABhY in Rajasthan	IWMI-Tata Program
14:50	15:00	Promoting water security through Water Stewardship approach: WOTR's experience in semi-arid Maharashtra	Ankita Yadav
15:00	15:50	**LESSONS FROM STATES | Moderator: S. Bhattacharjee** Reimagining *Atal Bhujal Yojana* (ABhY) **Panel: Yogesh Jadeja | Eshwer Kale | | Ajeet Hudda | Kumar Ranjan Parhi | Kiran H. Masuti | Chiranjit Guha**	
15:50	16:00	Reflections and Closing Remarks	Himanshu Kulkarni

Partners in Focus

Realizing the Potential of *Atal Bhujal Yojana*

Suchiradipta Bhattacharjee | Garima Taneja

The session on operationalizing the *Atal Bhujal Yojana* (Atal Jal) examined the challenges of embedding community-led approaches into groundwater management and the lessons that have emerged from the program's implementation. IWMI's findings emphasized the multi-dimensional approach needed to make groundwater governance participatory and sustainable. At the initiative's core is community engagement, with a strong focus on involving local stakeholders, civil society organizations (CSOs), and agricultural engineers in planning and implementing water security schemes. The scheme has rolled out across thousands of villages and has been supported by extensive training and awareness activities—over 80,000 training sessions have been conducted. While this scale demonstrates the ambition of ABhY, questions of inclusivity, sustainability, and institutional convergence remain.

Speakers highlighted that equipping communities with formal training, orientation, and data literacy is essential for informed, evidence-based decision-making. Innovative methods, such as simulation games, were discussed as valuable tools for strengthening collective decision-making and building the skills required to navigate the complexities of groundwater budgeting. Field experiences shared by state-level officials and partners highlighted both progress and ongoing limitations. For instance, although community engagement has often been successful, capacity gaps persist in regions lacking local technical expertise. Gender inclusion was also noted as a weakness, with women frequently excluded from leadership and decision-making structures. Furthermore, long-term sustainability remains uncertain, particularly given the financial challenges faced by smallholder farmers.

Panelists also shared specific experiences from states. Kumar Ranjan Parhi (CMF) described a structured model of participatory water management involving workshops, water security plans, and social audits, which foster both accountability and community leadership. In Gujarat, Yogesh Jadeja (Arid Communities and Technologies, ACT) emphasized the need for district-level technical support and stronger integration of recharge measures with agricultural practices. In Karnataka, Kiran Masuti (State Program Management Unit, *Atal Bhujal Yojana*, Karnataka) highlighted the revitalization of ancient tanks and the promotion of micro-irrigation as part of a comprehensive strategy that also links farmers to markets to encourage the adoption of less water-intensive crops. These examples underlined that while a participatory framework can be powerful, it must be complemented by locally relevant strategies and institutional backing.

In concluding reflections, chair Himanshu Kulkarni (ACWADAM) reminded participants that India's groundwater story has evolved from resource development in the 1970s to resource management today. He urged the group to recognize the duality of governance: balancing information with participation, and competition with equitable access. He cautioned that ABY's promise depends on institutional clarity and its ability to converge effectively with other programs, including *Pradhan Mantri Krishi Sinchai Yojana* (PMKSY) for demand management and the *Jal Jeevan Mission* for source sustainability. He also emphasized that interventions must be designed in ways that communities are willing to embrace, or they risk remaining symbolic.

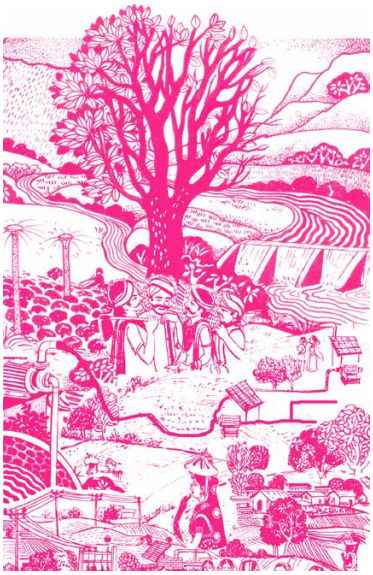
The session closed with several key takeaways: groundwater must be managed with equity and efficiency as guiding principles; community participation and leadership are indispensable for sustained impact; reliable and accessible data should underpin village-level decision-making; and greater policy coherence across agriculture, water, and energy is urgently needed. Overall, the discussion concluded that while ABhY offers a strong framework for participatory groundwater governance, its long-term success will depend on systemic institutional reform, grounded community ownership, and meaningful convergence with parallel initiatives.

T3-S5 Groundwater Governance

Global Experiments and Approaches

Date: 19th September 2024 | **Venue: Training Room #04** | **Time: 16:30 – 18:00**

Custodian: Suchiradipta B. | **Chair: Alok Sikka** | **Rapporteur: Garima Taneja**



Approaches to groundwater governance have taken various shapes across the globe. Regulatory approaches have used policies to control groundwater extraction and ensure sustainability. Market-based approaches have explored mechanisms to incentivize conservation and efficient use. Supply augmentation approaches have focused on increasing groundwater availability, while demand management has focused on reducing groundwater extraction by promoting water-efficient technologies. Community-based approaches have often encouraged local users to manage groundwater resources collectively, fostering a sense of ownership and accountability. There have also been efforts to indirectly impact groundwater recharge and quality. All these approaches have their nuances and varying rates of success.

However, what remains elusive to the larger scientific and development community is how to scale the success to a much larger scale. In settings as heterogeneous as India's, increasing groundwater depletion exacerbated by climate change becomes a bigger challenge. Policies like *Atal Bhujal Yojana* implemented in some of the 'dark zones' across the country are important steps in the right direction. Moving forward, with new and emerging challenges of extraction, depletion, and quality, what should ABhY focus on? What should India's future groundwater policies look like?

From	To	Title	People
16:30	16:40	Groundwater Governance in India: The Story So Far…	Himanshu Kulkarni
16:40	16:50	**ITP Keynote** Water, Energy, Food Nexus in Action: Global Experiences	T. Shah, S. Verma
16:50	17:50	**MODERATED DISCUSSION | Moderator: S. Bhattacharjee** The Tricky Business of Groundwater Management **Panel: M. Dinesh Kumar | Shuchi Vora | Tushaar Shah | R. C. Jain**	
17:50	18:00	Session Chair's Reflections	Alok Sikka

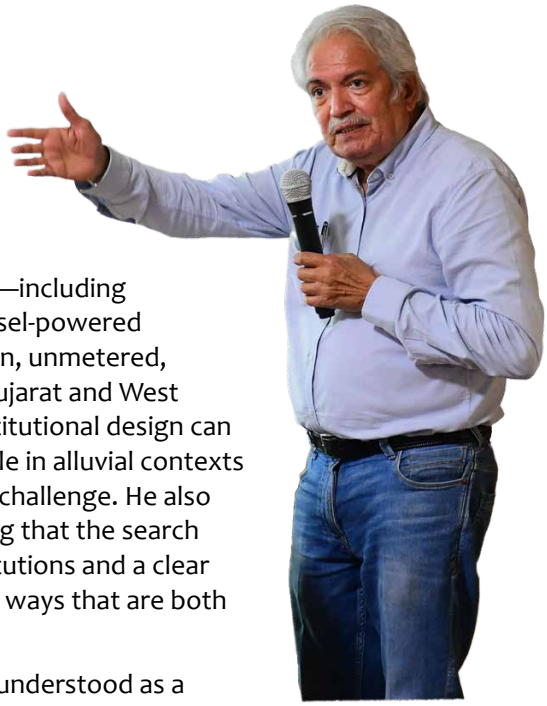
Partners in Focus

CGIAR Initiative on National Policies and Strategies | ACWADAM

The Gordian Knot around Governing Groundwater

Suchiradipta Bhattacharjee | Garima Taneja

The session on groundwater governance extended the conversation from Atal Jal's programmatic focus to wider institutional and policy challenges. Opening interventions emphasized the range of governance models used worldwide, like regulatory controls, market-based incentives, community-led approaches, and supply augmentation measures, and reflected on their varied outcomes. The central concern was how to scale successful practices in a country as diverse as India, where groundwater depletion is intensifying under climate stress.



Tushaar Shah (IWMI) highlighted the institutional gaps that perpetuate unsustainable groundwater use, stressing that governance rests on the alignment of social, economic, and political systems. He drew attention to the problem of perverse incentives, arguing that fixing them is "necessary and sufficient to create three-pillar sync." Using a global map of groundwater-energy-food (WEFE) nexus typologies, Shah illustrated how regions vary in the regulation of groundwater pumping. He noted that in many parts of South Asia—including eastern India, Bangladesh, and Pakistan—the system remains dominated by diesel-powered unregulated irrigation or electricity-powered unregulated pumping, where stolen, unmetered, and subsidized power drives very high groundwater use. By contrast, parts of Gujarat and West Bengal operate on regulated, metered electricity tariffs, demonstrating that institutional design can significantly influence usage patterns. The heterogeneity of aquifers, manageable in alluvial contexts but far more complex in hard rock regions, further complicates the governance challenge. He also unpacked the political economy challenges of groundwater governance, warning that the search for a politically feasible way out remains critical. The need for participatory institutions and a clear groundwater administration was highlighted as essential for steering reforms in ways that are both effective and socially acceptable.

Building on this, Dinesh Kumar (IRAP) emphasized that groundwater should be understood as a common-pool resource, pointing to the absence of correlative rights in India as a structural weakness that enables inequitable extraction. He noted that while technical solutions like drip irrigation are often promoted, they do not automatically reduce water use, and stronger economic instrumentssuch as pricing and rationingare needed. R.C. Jain (Gujarat Water Resources Development Corporation, GWRDC) highlighted how agricultural subsidies, procurement prices, and MSPs lock farmers into water-intensive cropping patterns, arguing for diversification and electricity pricing reforms. Shuchi Vohra (Global Resilience Partnership) added that traditional governance frameworks will not suffice in the face of climate change, urging a shift from "trade-off" thinking to "synergy," where behavioural science, local knowledge, and equitable pricing mechanisms converge to build resilience.

In his closing reflections, Alok Sikka (IWMI) reinforced that demand management must take precedence over supply augmentation, citing Haryana, where much of the water savings came from managing demand. He urged states to explore innovative pricing and incentivization, tied to crop diversification and efficiency benchmarks, as alternatives to subsidy-driven regimes. The session concluded that revitalizing India's groundwater governance requires systemic reforms of aligning incentives, strengthening participatory institutions, clarifying rights and responsibilities, and ensuring that equity and efficiency guide future strategies.

T4-S1B Climate Resilience in Asia's Water Towers

Water, Energy and Sustainable Development of Himalayan Communities

Date: 19th September 2024 | **Venue: Training Room #06** | **Time: 10:30 – 13:00**

Custodians: Rajesh T. | Arun P. | **Chair: Ravi Chopra** | **Rapporteur: Manya Dixit**

Often referred to as the 'Water Towers of Asia', the mighty Himalayas feed many of Asia's largest rivers and provide water to well over a billion people in India, Pakistan, Bangladesh, and China while forming a hydrological barrier between the Indian sub-continent and the rest of Asia. The Indian Summer Monsoon is the primary source of moisture for most of the area, but the Western Disturbances are responsible for much of the winter precipitation. Rising temperatures and climate change are predicted to impact different sub-regions differently and will likely lead to melting glaciers, increased forest fire and changing rainfall periodicity which adversely impact the recharge of mountain aquifers. Simultaneously, the region is witnessing significant changes owing to development and modernization with growing dependence on infrastructure and imported inputs for supporting local livelihoods.

The objective of this session is to bring together key civil society partners invested in sustainable development of the region and to initiate a discussion on the role that IWMI-Tata Program can play in supporting these partners. The two-part session will revolve around three themes and seven sub-themes identified for discussion. The first part of the session (T4S1A) will focus on providing an overview to the impacts of climate change in the Himalaya and Himalayan hydrology while the second part (T4S1B) will focus on aspects of sustainable development of Himalayan communities.

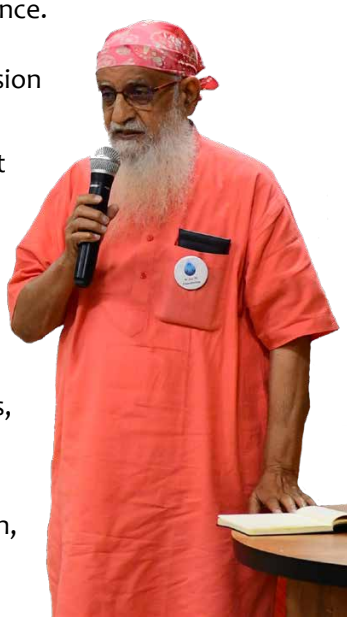
From	To	Title	People
10:30	10:50	Mountain Springs and Recharge Zones	Vinod Kothari, Khrolhiweu Tsühah (Awi)
10:50	11:10	Watershed and Forest Protection	R.S. Koshyari, R.S. Negi, Nagato K. Aye
11:10	11:30	Snow and Ice Conservation	Samten Choephel, Rajesh Thadani
11:30	11:50	Delivering and Managing Drinking Water in the Himalayas	Vinod Kothari, Divyang Vaghela
11:50	12:10	Sustainable Development Models for the Himalayas	Yashpal Bisht, B. Lalrinkima
12:10	12:50	**PANEL DISCUSSION** Way forward for ITP and Partners **Leads: Rajesh Thadani, Arun Pandhi**	
12:50	13:00	Concluding Remarks and Way Ahead	Ravi Chopra

Partners in Focus

Community Action for Sustainable Development

Rajesh Thadani | Arun Pandhi | Manya Dixit

The session highlighted the vulnerability of Himalayan communities and pathways towards resilience. Emphasis was placed on community participation, reliable data, and the centrality of springshed development. From artificial glaciers in Ladakh to zone-specific drinking water strategies, the session presented grounded, innovative approaches for Himalayan sustainability.



The session opened with Vinod Kothari (Himmotthan Society) and Khrolhiweu Tsühah (North East Initiative Development Agency, NEIDA), who discussed the centrality of springs to mountain ecosystems and communities and their respective organizations' work on rejuvenation. Once the lifeline for mountain communities, recent decades have seen numerous reports of springs *drying up*, forcing communities to seek alternatives. Vinod spoke of a participatory approach to water management in Himalayan villages involving water budgeting, classifying springs as community assets, and linking them to livelihoods. The speakers highlighted pioneering spring revival efforts and challenges to scaling, such as the hydrological complexity of mountain aquifers, data gaps, and limited state as well as local capacity.

This was followed by R.S. Koshyari (Tata Trusts), R.S. Negi (Himmotthan Society), and Nagato K. Aye (NEIDA), whose presentation emphasized the importance of watershed and forest protection, advocating watershed management as a more accessible and holistic approach compared to aquifer management. They discussed NEIDA's watershed development model in Nagaland, which demonstrated gains in fodder harvests and *Mithun* conservation but raised concerns about sustainability beyond the project life. The discussion emphasized integrating livelihoods into watershed programs to secure community ownership and long-term impact.

Samten Choephel (Himmotthan Society) and Rajesh Thadani (CEDAR) presented on artificial glaciers for snow and ice conservation in Ladakh, highlighting the unique challenges faced in the region. Climate change has led to warmer winters, reduced snowfall, altered rainfall, shifting crop patterns, and resource depletion from glacial dependence affecting 30% of the population and forcing relocation. Locally led innovations like Ice *Stupas* and artificial glaciers have the potential to store water, extend cropping and reduce migration – contingent on context-specific solutions, better topographical data, financial and organizational support, and adequate system upkeep.

The presentation by Vinod Kothari (Himmotthan Society) and Divyang Vaghela (Tata Trusts) focused on delivering and managing drinking water systems in the Himalayas. They discussed identifying water issues specific to different zones and employing both vegetative and engineering solutions tailored to each zone's needs. Vinod Kothari flagged key considerations such as the difficulty tail-end villages face in participating in water management, the effectiveness of springshed approaches in mountainous areas and water quality concerns. The two noted that *Jal Jeevan* Mission (JJM) has improved pipeline infrastructure in many rural areas and that the next challenge is ensuring the sustainability of these systems.

Yashpal Bisht and B. Lalrinkima (Himmotthan Society) highlighted the significance of microclimates within the Himalayas and the current water demand status in villages. They spoke about challenges such as water scarcity, limited income, unproductive agriculture, large-scale out-migration, and youth disinterest in farming. The presenters suggested solutions that prioritize water management, encourage collective action, implement nature-based practices, and promote sustainable tourism.

The session underscored the importance of community participation, targeted interventions, and reliable data for Himalayan waters, advocating springshed over watershed approaches while linking livelihoods to environmental strategies. It emphasized artificial glaciers as a sustainable solution in Ladakh, called for zone-specific water management, and stressed community-led approaches, echoed in the Chair's statement: "*When you give people a chance to control and manage local resources you see sustainability in everything.*"

T4-S2 Towards Water Positive Municipalities

Date: 19th September 2024	**Venue: Training Room #06**	**Time: 14:30 – 16:00**
Custodian: Deepa M.P.M.	**Chair: S. Vishwanath**	**Rapporteur: Lamnganbi Mutum**

India's municipalities are struggling to manage water and water infrastructure. Rapid, unplanned urbanization means that peripheries remain left out of the water supply and drainage network. Both the connected core and the periphery face acute water scarcity each summer and must rely on private borewells or tankers to meet water demand. Poorly planned urban infrastructure and drainage means each spell of rain brings the city to a standstill, causing water logging in several areas. Groundwater levels are plummeting in most cities and much of urban India is way past the definition of 'Day Zero' – "the day when a city can no longer supply water to its residents, at-home faucets stop running, and municipalities enforce water rations and restrictions in the hopes of at least maintaining subsistence, sanitation, and hygiene". India's wastewater treatment infrastructure is expanding – but not fast enough. Annually, urban India generates 30 billion cubic meters of wastewater. More than 60 per cent of this is discharged downstream without any treatment. This mismanagement has shifted the focus of municipal water from cascading tanks to tankers, from holy rivers to heavily polluted drains, and from an ancient civilization known for its excellence in hydraulic engineering to poorly managed municipal infrastructure.

As dismal as this sounds, there's room for hope. With rising incomes and growing economy, India's municipal water and wastewater economy is expected to attract enormous public and private investments in the coming decades. If urban India learns to manage her rainfall well, we can avoid the cycle of annual flooding followed by water scarcity; it can also help rejuvenate parched water bodies and recharge depleted aquifers. If managed well, urban India's wastewater can become as reliable a water source as groundwater. In this session, we bring together expertise and experiences in urban water management to discuss opportunities for ITP to contribute to this growing and important sub-sector in India's water economy.

From	To	Title	People
14:30	14:40	**ITP Keynote** Water Positive Municipalities: Achievable or Pipe Dream?	Deepa M.P.M.
14:40	15:50	**MODERATED & OPEN DISCUSSION** Towards Water Positive Municipalities **Panel: Uday Bhonde | Ayushi Kashyap | Usha Rajagopalan | Alka Palrecha**	
15:50	16:00	Reflections and Way Forward	S. Vishwanath

Partners in Focus

people in centre biome Environmental

Smart Governance for Sustainable Cities

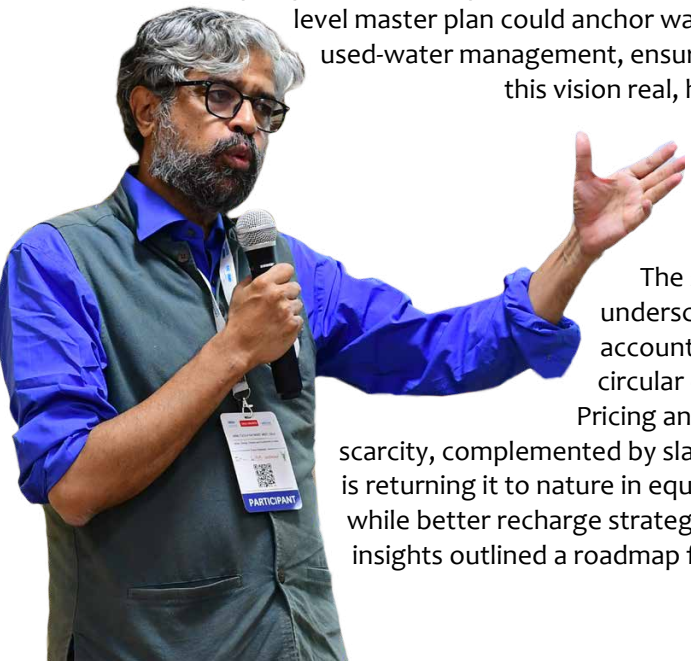
Deepa M.P.M. | Lamnganbi Mutum

The session opened a window into reimagining urban water systems for resilience and sustainability. Conversations highlighted integrated planning, innovative policies, and sustainable practices to balance demand, restore cycles, and build resilience. Speakers explored circular economy pathways, equitable pricing and metering to curb overuse, water slabs to reduce inequalities, and the true cost of water as returning it to nature in the same quality. Governance gaps such as reliance on private tankers and poor recharge planning underscored the urgency for ecological restoration, inclusive governance, and innovative financing to make water-positive cities a reality.

ITP keynote by Deepa M.P.M. (IWMI) set the stage for a vibrant exchange of ideas. She spurred discussion on what it takes for cities to break tanker dependency and achieve water security. The conversation examined how urban India consumes and mismanages water, the tanker economy's politics, and the wastewater treatment gap. Decentralized treatment emerged as a solution where central systems fail. Case studies of Mansagar Lake in Rajasthan and Kaikondrahalli Lake in Karnataka showed how community-driven efforts revive neglected water bodies. The keynote left participants reflecting on ITP's potential urban water role.

Picking up from Deepa's keynote, the session moved into an open and spirited panel moderated by Vishwanath S (Biome Environment Trust), featuring Alka Palrecha (People in Centre), Ayushi Kashyap (Council on Energy, Environment and Water), Uday Bhonde (National Institute of Urban Affairs) and Usha Rajagopalan (Puttenahalli Neighbourhood Lake Improvement Trust). The dialogue focused on practical aspects of water-positive cities, stressing the need to view the water cycle as a complete system—from entry to discharge. Panelists emphasized that optimal requirements involve both quantity and frequency. Pricing was framed as conservation and maintenance, not commodification. Graded pricing of treated wastewater, varying with treatment levels, stood out as a promising idea. The exchange underlined how planning and economics can reshape urban water management effectively.

Wrapping up the session, the session chair, Vishwanath pulled the conversation together with a forward-looking perspective. He emphasized that water-positive cities require clear roadmaps, not ad hoc fixes. A city-level master plan could anchor water budgeting and long-term planning. He called for integrated used-water management, ensuring every drop is tracked and reused wherever possible. Making this vision real, he stressed comprehensive databases for each city, mapping sources, use, treatment, distribution, and discharge. His remarks left participants convinced that achieving water positivity depends as much on governance and data-driven planning as it does on infrastructure or technology.



The session closed on a reflective yet action-oriented note, underscoring that water-positive cities are a tangible goal with vision and accountability. Speakers stressed reimagining urban water through a circular economy lens where lakes and water bodies thrive as living assets. Pricing and metering were seen as essential to curb overuse and reflect scarcity, complemented by slabs to reduce inequity. The real cost of water, participants agreed, is returning it to nature in equal quality. Reliance on private tankers was called a planning failure, while better recharge strategies were highlighted to prevent urban flooding. Together, these insights outlined a roadmap for resilient cities.

T4-S3 India's *Har Ghar Jal* Mission

Date: 19th September 2024	**Venue: Training Room #06**	**Time: 16:30 – 18:00**
Custodian: Divyang W. | Liby J.	**Chair: Apoorva Oza**	**Rapporteur: Lamnganbi Mutum**

On 15th August 2019, more than 70 years after independence, less than 1 in 5 of India's ~200 million households had tap water connections. Since then, the government has spent more than INR 3.13 lakh crore (USD 37.3 billion) to reverse this ratio and as per the latest available information, nearly 4 in every 5 households have a tap water connection. This is impressive, especially considering the physical and financial constraints imposed on the campaign by the CoViD-19 outbreak. However, questions remain about the functionality and maintenance of infrastructure, reliability of supply, sustainability of water source (nearly 3/4th schemes rely on groundwater) and the quality of water supplied. Progress is also not uniform across geographies (poorer regions being worse performers) and socio-economic groups (with the poorest and marginalized groups often remaining deprived).

This session brings together researchers, practitioners and experts who have been working with JJM and communities to help the program deliver on its objectives. The purpose of the gathering is to: [1] discuss challenges and opportunities in JJM; [2] highlight best practices; and [3] help ITP identify and develop an agenda for research and action research around JJM.

From	To	Title	People
16:30	16:40	Stock taking on JJM Implementation and Key Issues for Discussion	Divyang Waghela
16:40	17:10	Best Practices in JJM Implementation	Open Discussion
17:10	17:50	**PANEL DISCUSSION | Moderator: Eklavya Prasad** Delivering *Jal* and *Jeevan* Reliably, Equitably, and Sustainably **Panel: S. Krishnan | Himanshu K. | Nafisa Barot | Naveen Patidar**	
17:50	18:00	Concluding Remarks	Apoorva Oza

Partners in Focus

Policies and Practice for Delivering *Har Ghar Jal*

Divyang Vaghela | Liby Johnson | Lamnganbi Mutum

The session picked up from the broader objectives outlined in the mission, moving the focus from progress metrics to practical implementation and ground realities. Discussions revolved around the program's foundations, community participation, and strategies to ensure sustainability, equity, and accountability in water supply. The session highlighted how lessons from past initiatives, combined with engagement and systematic support, can shape JJM in delivering functional, reliable, and inclusive water access across India.

The session opened with Divyang Waghela's (Tata Trusts) presentation which drew attention to the scale and ambition of India's water supply efforts. The discussion unfolded around infrastructure expansion, with tap water access reaching 78% of households, while probing challenges that accompany such growth. He highlighted gaps in community engagement, noting NGOs are often viewed as service providers rather than catalysts of social capital.

Building on insights from Divyang Waghela's presentation, the session transitioned into an open discussion moderated by Eklavya Prasad (Megh Pyne Abhiyan), where Liby Johnson (Gram Vikas) offered a perspective rooted in experience and realities. The dialogue referenced Gram Vikas, Mission Bhagirath, and Basudha, which aim to ensure sanitation alongside clean water. Emphasis was placed on community-managed supply, noting first-generation issues require engagement, while second-generation challenges demand technological finesse, especially in aquifer management. Liby stressed equitable, affordable, and sustainable access, with improved grey water management. Gaps in cooperation, tied to accountability deficits, were flagged. Suggested strategies included research, mobilization, and capacity-building using NGO expertise, bridging ambition with practical action.

Continuing the discussion, Naveen Patidar (AKRSP-I) shared insights on strengthening operational and research dimensions of JJM. The focus was on empowering village committees through mobilization, identifying indicators, and introducing user charges. He emphasized reliable service providers and the importance of repair and maintenance for sustained functionality. Drawing from experiences in Bihar, he showed how digital tools like SMS notifications improve transparency in financial management. The conversation outlined practical interventions linking governance, technology, and engagement, stressing pathways to make JJM accountable, responsive, and sustainable.

The discussion took a critical turn when Sunder (INREM Foundation) highlighted two challenges: politicization of water data and deteriorating pipelines and installations. Nafisa Barot added that ensuring supply and leadership is crucial for success. Audience questions spotlighted Gram Panchayats' hesitancy to accept new systems from PHED, raising concerns over civil society roles and operational costs. Reluctance stemmed from transferred responsibility and limited trust in system quality. Participants stressed that handovers must guarantee financial and technical support, drawing on established precedents. With clear assurances, Gram Panchayats can be empowered to manage supply sustainably, overcoming gaps in trust and leadership.

As the session drew to a closure, discussion crystallized around JJM's achievements and gaps. Participants reflected on the crucial role of community participation and NGO mobilization. Focus areas needing attention included building trust in water quality, sustaining sources, ensuring equitable distribution, and strengthening Panchayats with performance metrics. Engagement, aquifer management, research in underserved regions, and capacity building were recurring themes. Concerns around accountability, politicized data, and hesitant local bodies showed the need for continued support. Addressing imperfections, the session closed reflectively: "*Is JJM not learning from past experiences?*" or "*Is it a millennium city without pow?*"

DAY-03
Friday
20th September

08.30 to 10.00

P-4

Emerging Challenges and Promising Solutions

| Shilp Verma |

07.30 to 10.00

Field Trip #4
Climate Smart Gobar Value Chain
| Niraj Trivedi |

Field Trip #5
Solar Pump Irrigators' Cooperative
| Rahul Rathod |

10.30 to 13.30

P-5

Synthesis and Feedback
Delivering Prosperity with Resilience

Track #1: Water-Energy-Livelihoods Nexus | Nikunj Usadadia
Track #2: Catalyzing Smallholder Prosperity | Philip Kuriachen
Track #3: Water Governance and Risks | Suchiradipta Bhattacharjee
Track #4: Emerging ITP Themes | Lamnganbi Mutum

High Tea 10.00 to 10.30

Lunch Break 13.30 to 15.00

P-4 Day-03 Opening Plenary

Emerging Challenges and Promising Solutions

Date: 20th September 2024 | **Venue: T.K. Patel Auditorium** | **Time: 08:30 – 10:00**

Custodian: Shilp Verma | **Chair: Alok Sikka** | **Rapporteur: Vidya Mandave**

One of the new themes on which ITP plans to expand its work is improved management of municipal water and wastewater. We are excited to have Meera Mehta (Professor Emeritus, CEPT Research and Development Foundation; Head, Centre for Water and Sanitation, CEPT University) to speak about India's massive municipal water challenge and some promising developments in this field.

India has been on a mission to clean the Ganga River for more than four decades. Despite significant investments and political support, it seems the more we try to clean, the worse it becomes. ITP invited M. Dinesh Kumar – also of ITP vintage – to talk about market instruments and institutions for addressing this massive challenge.

Finally, we are delighted and privileged to have IWMI's Director General and Senior Director, Water Systems at CGIAR, Mark Smith, to speak about how ITP's work fits into the larger vision, mission and strategy of IWMI and within the CGIAR.

From	To	Title	People
08:30	08:35	Welcome | Highlights from Day-02 | Introducing the Speakers	
08:35	09:00	**Invited Keynote** | India's Municipal Water Challenge and Promising Developments	**Meera Mehta** CEPT University
09:00	09:25	**Invited Keynote** | Looking beyond Technologies: Market Instruments and Institutions for Cleaning the Ganga	**M. Dinesh Kumar** IRAP
09:30	09:55	**IWMI Keynote** | R4D: Enabling Growth and Driving Action	**Mark Smith** IWMI
09:55	10:00	Plan for Rest of Day-03	

Addressing India's 'Wicked Water Problems'

Shilp Verma | Vidya Mandave

The opening plenary of Day 3 engaged with the theme of emerging challenges in water management. The session offered perspectives on municipal water supply, the Ganga's pollution crisis, and IWMI's global strategy, setting the stage for a discussion that explored questions around water infrastructure, governance, markets, and research partnerships.

Meera Mehta (CEPT University) presented on India's Municipal Water Challenge particularly focusing on last-mile connectivity in water supply and sanitation. Even in relatively better-performing states like Gujarat and Maharashtra, slum households and vulnerable communities remain excluded from water supply. Participants noted that bridging this gap requires not just infrastructure but new models of community participation, institutional accountability, and climate resilience. The conversation emphasized the need for cities to protect and recharge their own local water sources – through aquifer mapping, watershed management, and rainwater harvesting – rather than relying exclusively on bulk supply schemes. Innovative examples such as women's self-help groups managing solar-powered treatment plants, or "greening" urban water infrastructure with renewable energy, were highlighted as approaches that combine inclusion with resilience.

Financing emerged as another point of debate. The projected USD 840 billion required for India's urban infrastructure by 2036 underscores the limits of traditional public funding. While instruments like green bonds, carbon credits, and blended finance offer promise, participants questioned whether such mechanisms could be equitably scaled across smaller and poorer municipalities. The discussion also touched on the design of outcome-based contracts and impact bonds, noting both their potential to leverage private capital and the risks of shifting accountability away from the state.

Turning to the Ganga basin, the presentation by M. Dinesh Kumar (IRAP) demonstrated the complexity of non-point source pollution and groundwater quality, particularly nitrate leaching from agriculture, often overlooked in current cleanup programs. The discussion underscored that pollution cannot be addressed solely through engineering solutions or large-scale sewage treatment plants; it requires incentives and disincentives that reshape farmer and industry actions. Suggestions included water resource taxes for heavy users, pollution levies for industries, and incorporating treatment costs into water tariffs. At the same time, concerns were raised about the political and social feasibility of such measures, given the entrenched subsidies and weak enforcement capacity that shape current water governance.

Mark Smith (IWMI) highlighted the role of research-for-development partnerships in shaping both national and global agendas. ITP's two-decade history of collaborative experimentation was shown as a model of how grounded evidence can influence policy, whether in rural electrification, solar irrigation, or farmer collectives. He advocated for such research to be better aligned with global strategies like CGIAR's 'genes to basins' framework, ensuring that local experiments feed into broader systemic change. The question of alignment – between ministries, global and national research agendas, researchers and communities – emerged as a recurring challenge. In his concluding remarks, Mark Smith reflected on the importance of collective action in addressing what he called 'wicked water problems'. He noted that the plenary illustrated both the promise and the difficulty of aligning infrastructure, markets, and governance around evidence. While technical solutions abound, he argued, their success ultimately depends on political will, institutional capacity, and the acceptability of reforms to communities themselves.

P-5 Synthesis and Feedback

Delivering Prosperity with Resilience

Date: 20th September 2024 | **Venue: T.K. Patel Auditorium** | **Time: 10:30 – 13:00**

Custodian: Shilp Verma | **Chair: Mark Smith** | **Rapporteur: Vidya Mandave**

This session will bring together the key learnings and deliberations from across the four tracks. ITP researchers will present a synthesis of each track, followed by comments and feedback from eminent experts in the field.

From	To	Title	People
10:30	11:00	Track #1 | Water-Energy-Livelihoods Nexus	Presenter: Nikunj Usadadia Discussants: Deepak Gupta | P. Sharma | G. Neelam
11:00	11:30	Track #2 | Catalyzing Smallholder Prosperity	Presenter: Philip Kuriachen Discussants: Apoorva Oza | R. Thadani | A. Tripathi
11:30	12:00	Track #3 | Water Governance and Risks	Presenter: Suchiradipta B. Discussants: H.Kulkarni | R. Pardikar| G. Amarnath
12:00	12:30	Track #4 | Emerging ITP Themes	Presenter: Lamnganbi Mutum Discussants: Ravi Chopra | M. Mehta | D. Waghela
12:30	13:30	Open Feedback Session Moderator: Shilp Verma	

Way forward for IWMI-Tata Program

Shilp Verma | Vidya Mandave

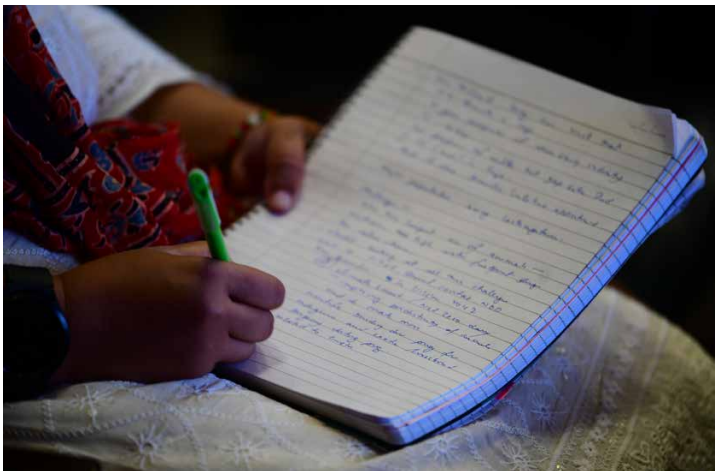
The final session of the event included 'track synthesis' presentations and feedback from key stakeholders. Ravi Chopra (People's Science Institute) opened the session recounting some of ITP's contributions over the years. He highlighted that the work on revival and rejuvenating 12-15,000 Himalayan Springs stems from discussions seeded at ITP. He reiterated the need for ITP to expand her footprint in the Himalayas and to build on the work of several partner institutions.

Synthesizing sessions in 'Track-01: Water-Energy-Livelihoods Nexus', Nikunj Usadadia (IWMI) outlined the spread of the discussions from a focus on the water-abundant, energy-scarce eastern Gangetic plains to water-scarce, energy-surplus regions in western and peninsular India. He recalled a bet made during one of the sessions, on whether significant share of Bihar's irrigation will be served by solar pumps in the coming years. In fact, the expansion of solar energy applications, and how they are reshaping the water-energy-agriculture nexus in rural India, was the connecting common thread across the track sessions. He highlighted the 3-D impact of solar irrigation pumps – Decarbonization, Decentralization and Digitalization – and listed the various business models discussed and debated – off-grid solar pumps, grid-connected SPaRC-enabled systems as well as agrivoltaics. In response, Prerna Sharma (GIZ) lauded the ITP-SE4RL collaborative work on field testing innovative business models and deployment strategies. She highlighted that the next phase of this collaboration will focus on 'women and solar energy', 'access to finance', and 'capacity building'. Ganesh Neelam (SPEF) reiterated the relevance of ITP's 'Nexus Approach' and urged ITP to design its work with 'livelihoods' at the core of this nexus – rather than energy or water. He also noted that while several organizations are working on solar, ITP can play a critical role in bringing all the learnings together and facilitating sharing of knowledge and experiences.

The synthesis of 'Track-02: Catalyzing Smallholder Prosperity' focused on instruments for making smallholder agriculture more resilient, profitable and aspirational. Philip Kuriachen (IWMI) presented an overview of the deliberations in each of the track sessions. The 'Dung to Dollars' discussion focused on ITP's experiment in *Saatordi* on entrepreneur-driven village-scale biogas enterprise as a viable model for managing the Gobar value chain. While lauding ITP's innovative model, the session urged ITP to undertake further innovations in biogas delivery and developing slurry-based products to improve viability. The discussion on 'Climate-sensitive Dairy Development' suggested a focus on reducing the water footprint of milk production in arid / semi-arid regions; and on analysing the potential of Milk Producer Companies (MPCs) to promote dairy in drought-prone regions. ITP's 'Small Farmer, Prosperous Farmer' (SFPF) initiative presented synthesis of 40-odd studies undertaken; with a plan emerging to develop and design context-specific training modules to widely share key lessons. ITP's work on fisheries catalyzed discussion on integrating fisheries in farm pond and tank rehabilitation programs to improve incomes and nutritional outcomes. The final session in the track showcased IWMI's tools for managing water risks, and on scaling their use through CSOs beyond project cycles.Arun Pandhi (P-Green Solutions) highlighted the centrality of this theme in a country where smallholder agriculture dominates rural livelihoods and value chains. He spoke about multi-dimensional risk associated with smallholder agriculture and the tremendous scope for ITP to contribute in shaping impact investments in this space.

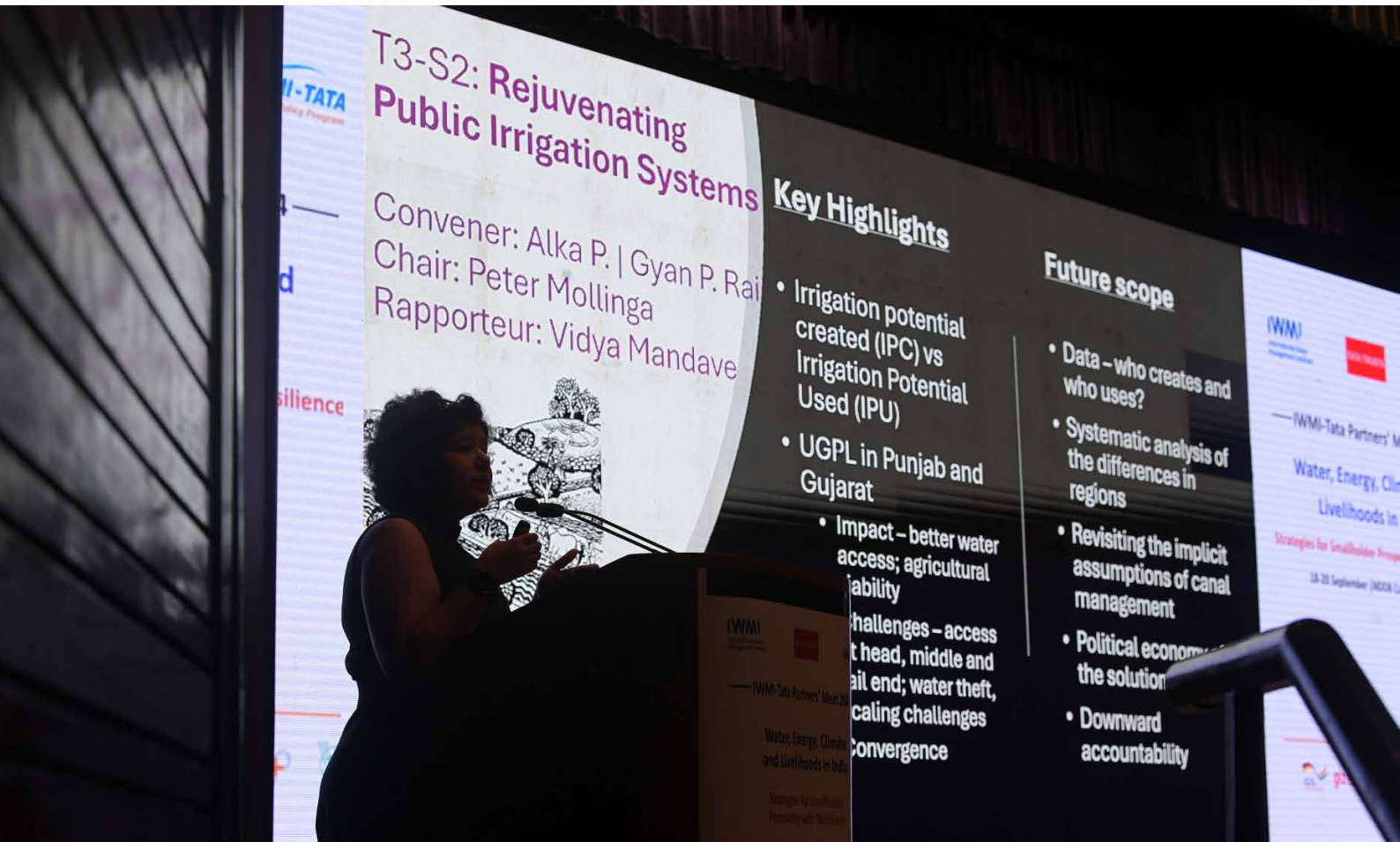
Synthesis of 'Track-03: Water Governance and Risks' by Suchiradipta Bhattacharjee (IWMI) covered key themes like groundwater governance, public irrigation systems, water-safe communities, and the vulnerability of coastal communities. The discussion on 'Blue Boundaries' showcased and discussed work on structural and non-structural measures for ecological restoration and livelihood improvement. The session identified seaweed cultivation, mangrove management, and investments in coastal infrastructure as areas for focused research. The session on public irrigation pitched for renewed efforts at maximizing irrigation and socio-economic benefits of massive investments in the sector. Experiences in piped delivery of canal water – an investment that emerged out of ITP's research – was discussed using case studies in Gujarat and Punjab. A case was made for systematic comparative studies, with a focus on political economy of modernizing canal irrigation. ITP partnered with INREM Foundation to understand the impact of water quality on rural livelihoods. The session examined the intersections of water quality, agriculture, and rural

livelihoods, moving from field-based evidence to policy debates. The linked sessions on 'Operationalizing *Atal Bhujal Yojana*' and 'Groundwater Governance' debated solutions to the wicked challenge of governing the invisible – but critical – resource. The challenge of balancing information and participation in AbhY, contradictions in regulatory framework, and socio-political acceptability of solutions were debated; besides exploring innovations in regulation, pricing, demand management, and cross-sectoral coordination. Rishika Pardikar (journalist) suggested that technical sessions should start with a primer – for anyone new to the context and discourse. She and Giriraj Amarnath (IWMI) emphasized the element of climate risk and the multiplicity of institutions engaged in and responsible for governing groundwater – which heightened the challenge; but also made it more critical.



Discussion around 'Track-04: Emerging ITP Themes' identified interesting new ideas and themes that deserve greater attention from IWMI/ITP and the wider policy discourse – Water and Livelihoods in the Himalayas, and Rural and Municipal Water Supply and Sanitation. Synthesizing the discussion, Lamnganbi Mutum (IWMI) shared key highlights. The twin sessions on climate resilience in the Himalayas focused on water security and sustainable development. The clear message from these was a call for ITP to develop a program of work focusing on water, livelihoods and nature-based solutions. The session on water positive municipalities focused on efforts to manage India's rapidly growing urban population and the means to deliver reliable and safe water services. The session on India's *Har Ghar Jal* mission brought together key issues and best practices in *Jal Jeevan* Mission (JJM) and highlighted the need to focus on source sustainability and community mobilization. Responding to the synthesis, Meera Mehta (CWAS-CRDF-CEPT University) appreciated the excellent presentations by young ITP researchers and urged ITP to invest in issues around awareness and financing, especially for municipal water management. Divyang Vaghela (Tata Trusts) commended ITP for the rich thematic and regional diversity in themes and reiterated the need for ITP to invest in Himalayas, coastal regions, water supply and wastewater management.

In his concluding remarks, Alok Sikka (IWMI) recalled ITP meets over the past 20+ years and how it is different from other conferences – primarily owing to the frank exchange of new and innovative ideas, solutions and viewpoints. He also outlined key synergies between ITP's mandate and IWMI India's growing work, especially around drinking water supply, source sustainability and inland fisheries – and the importance of 'systems approach' to addressing these critical challenges.



Glimpses from the field

SaatOrdi | Climate Smart Gobar Value Chain




Dhundi | Solar Pump Irrigators' Cooperative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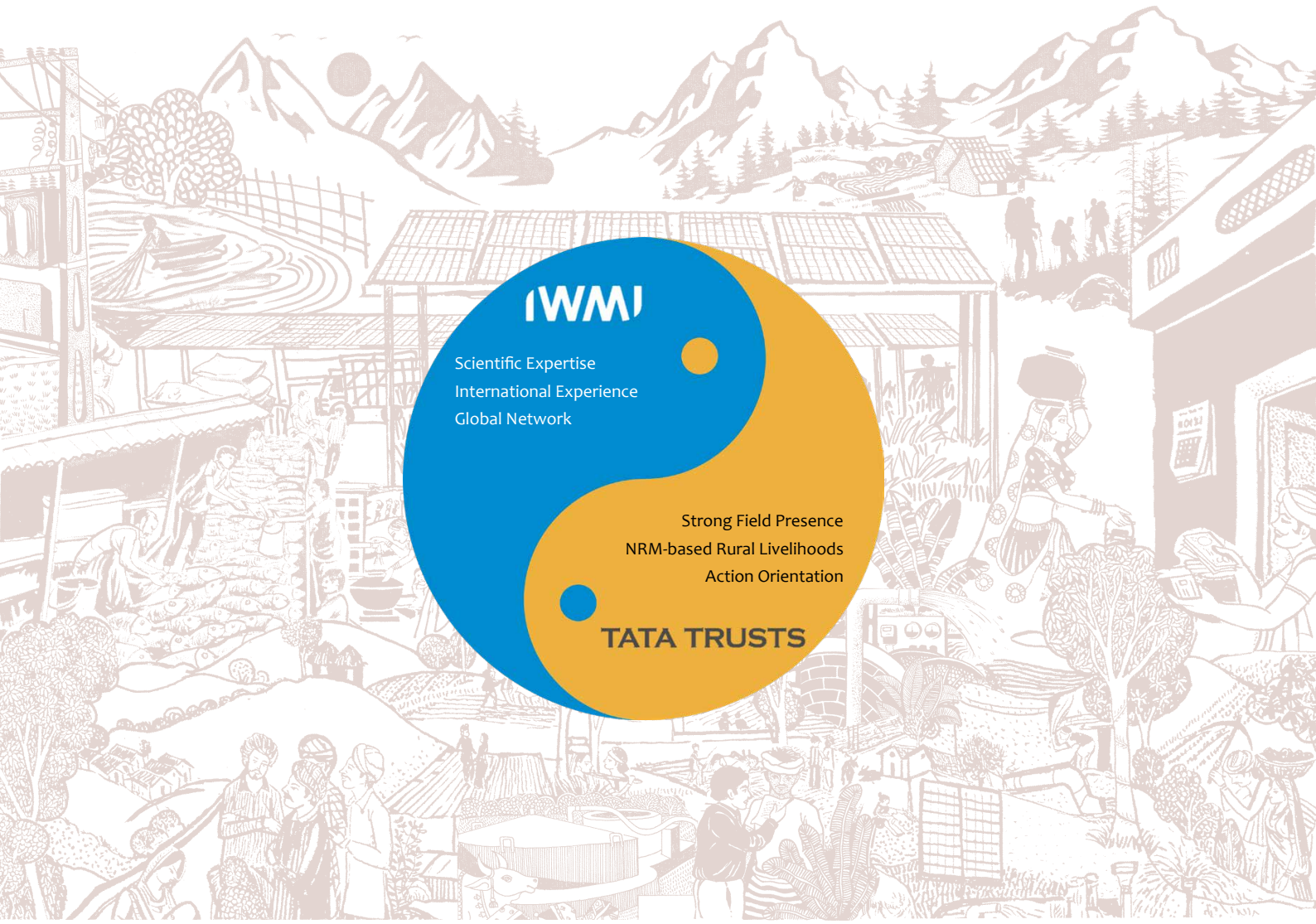

Contact

Global Headquarters
127, Sunil Mawatha,
Pelawatte, Battaramulla,
Colombo, Sri Lanka
www.iwmi.org

IWMI Delhi
2nd Floor, CG Block C,
NASC Complex, DPS Marg,
New Delhi 110 012, India
iwmi-delhi@cgiar.org

IWMI Anand
203, Second Floor,
Cube-0675, Vallabh Vidyanagar
Anand 388 120. Gujarat, India
iwmi-anand@cgiar.org


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