WELL LABS

WATER · ENVIRONMENT · LAND · LIVELIHOODS

Annual Report

2024–2025

Contents

Foreword

From the Desk of the Executive Director

In April 2025, WELL Labs completed two years. The journey has been incredible—we started with 30 people and have now more than doubled in size, both in terms of personnel and projects. Over the past year, we laid the groundwork to solve complex problems in the water sector at scale, which requires addressing their links to environmental, land, and livelihood challenges.

Our experience showed that a 'product' approach to scaling solutions—finding a solution that works and then scaling it—is not appropriate for water issues.

While it might work in the technology sector, environmental challenges are multi-faceted and involve zero-sum games (interventions benefit one group only at the expense of another).

Farm ponds, a common intervention in the water sector, illustrate this challenge. They benefit the farmers who build them, but could reduce water availability downstream, as the total water in the watershed remains the same. Thus, wealthier farmers, who can afford to sacrifice a part of their land to build farm ponds, capture rainwater, while water bodies downstream, typically accessed by landless herders, often dry up.

Another approach to scaling solutions is 'systems transformation', that is, enabling a structural shift in how interconnected systems (such as economic, ecological, social, etc.) function.

Many systems persist in low-level equilibria, because of 'lock-ins'—a situation where interdependent institutions, technologies, behaviours, and incentives become so entrenched that they reinforce each other, even though they might negatively impact most stakeholders. Lock-ins make it difficult to shift to an alternative system, even when the current one is not effective, equitable, or sustainable.

Irrigation projects in India exemplify these lock-ins and systemic challenges.

Federal and state governments spend ₹50,000-100,000 crore annually on dams and canals, but the net irrigated area has largely stayed stagnant. This is because water distribution in most canal-command areas is inequitable and inefficient.

Farmers at the head-end of the dam receive most of the water, while the tail-end remains dry. Thus, tail-end farmers refuse to pay to maintain the system, hampering its upkeep. This results in the control over water becoming less reliable, leading to waterlogging at the head-end.

Since paddy is one of the few crops that thrives in waterlogged conditions, farmers are locked into paddy cultivation even though they could potentially earn more from crops requiring less water. Thus, everyone ends up being stuck in a non-functioning, sub-optimal system.

WELL Labs overcomes water challenges in India by breaking such systemic lock-ins.

Moving systems that are stuck requires addressing multiple lock-ins simultaneously to reconfigure the whole system. This approach helped us identify four overarching goals:

Goal 1: Transform the lives of rural residents by increasing agricultural incomes while restoring degraded land and water.
Goal 2: Make Indian cities and towns more water-resilient and water-secure through water circularity and nature-based solutions.
Goal 3: Redirect spending in the water sector to improve climate resilience and water security.
Goal 4: Scale up the generation and exchange of knowledge and evidence in the social sector.

Each goal has a roadmap—a set of outcomes or milestones that lay out how it will be achieved.

Our roadmap helps us deploy our scientific expertise to test different approaches and identify the drivers of impact across urban and rural landscapes. Each outcome is associated with a hypothesis that demonstrates how the activities and outputs we generate will result in a particular desired outcome. The theory of change for each goal ties together the causal links and hypotheses we have formulated based on the available scientific evidence and insights from other interventions.

Towards our rural transformation goal, we are building equitable canal water distribution systems and improving agricultural productivity.

In this endeavour, we are working closely with Prarambha and the Canal Area Development Authority to build piped field irrigation channels in the Narayanpura Right Bank Canal Distributary 10, while reducing water-intensive monocultures and the heavy use of synthetic pesticides and fertilisers.

Towards our urban water goal, we developed a framework for lake rejuvenation.

Over 100 organisations and individuals have shown interest in collaborating on the framework, which was built in partnership with the Bruhat Bengaluru Mahanagara Palike (BBMP), DCB Bank, and Friends of Lakes.

Towards our goal of redirecting funding in the water sector, we established the Water Index for Sustainability, Equity, and Resilience (WISER) initiative to accurately assess and monitor water security outcomes.

In partnership with the Environmental Defense Fund, we conducted three in-depth evaluations of large-scale water-security interventions and are building a toolbox to make monitoring, evaluation, and learning more robust and accessible for grassroots organisations with limited resources.

Towards our goal of scaling knowledge exchange, we launched the Green Rural Economy (GRE) platform.

GRE connects changemakers with service providers to accelerate the discovery and implementation of sustainable solutions. We facilitated 80 matches between organisations working on various themes, such as agriculture, waste management, and livelihoods, and created 40 playbooks on these topics to promote cross-learning.

Our approach has resulted in significant wins in terms of working with governments to shape policies and programmes, and developing frameworks and toolboxes to optimise impact.

The year ahead promises to be even more exciting as we build upon our systems transformation work.

We look forward to leveraging our partnerships with governments, businesses, and civil society organisations to scale successful solutions and transform the water sector.

Dr Veena Srinivasan
Executive Director
WELL Labs

Programmes

Rural Futures

Urban Water

Technical Consulting

Platforms and Partnerships

Futures Research

Rural Futures

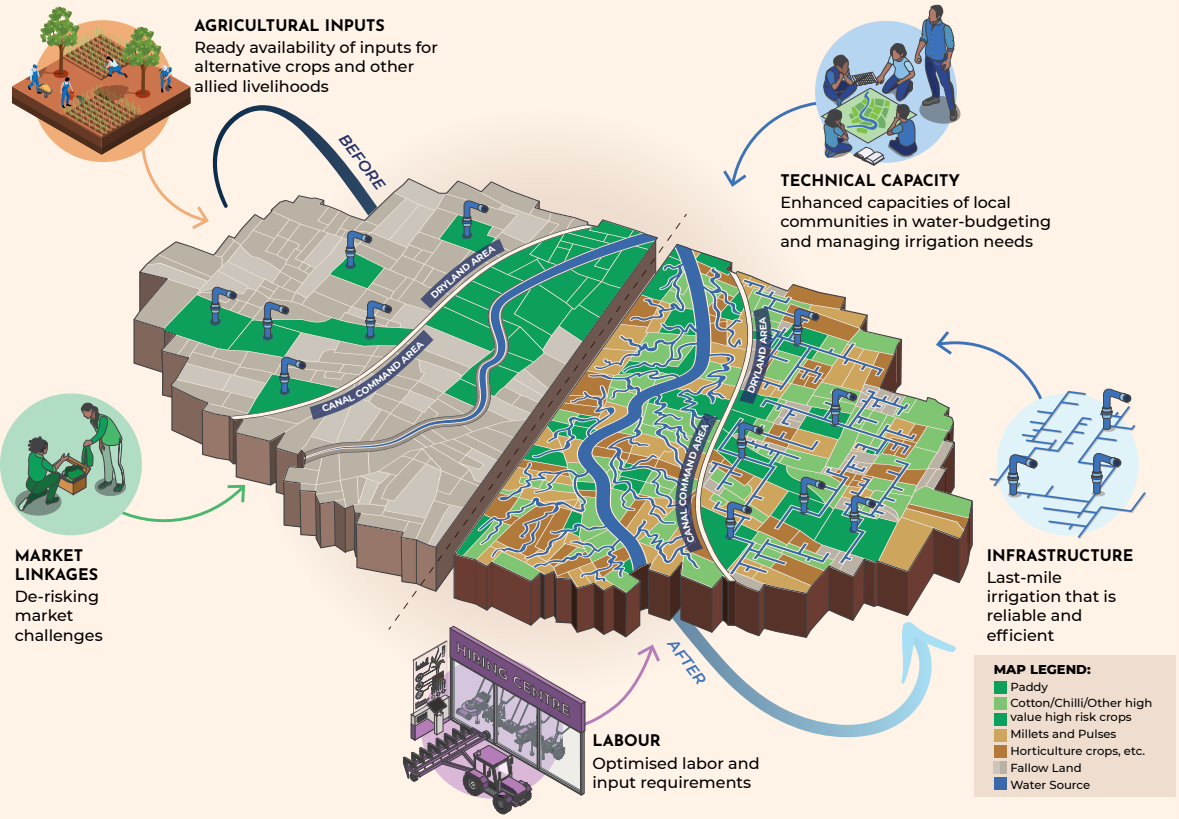
The Rural Futures programme transforms rural lives and livelihoods by increasing farming incomes while restoring degraded land and water resources.

The Rural Futures programme works in Raichur, Koppal, and Chikkaballapur districts of Karnataka to address the interlinked challenges of unequal water access, land degradation, and low farming incomes in both canal-irrigated and dryland (rainfed) landscapes.

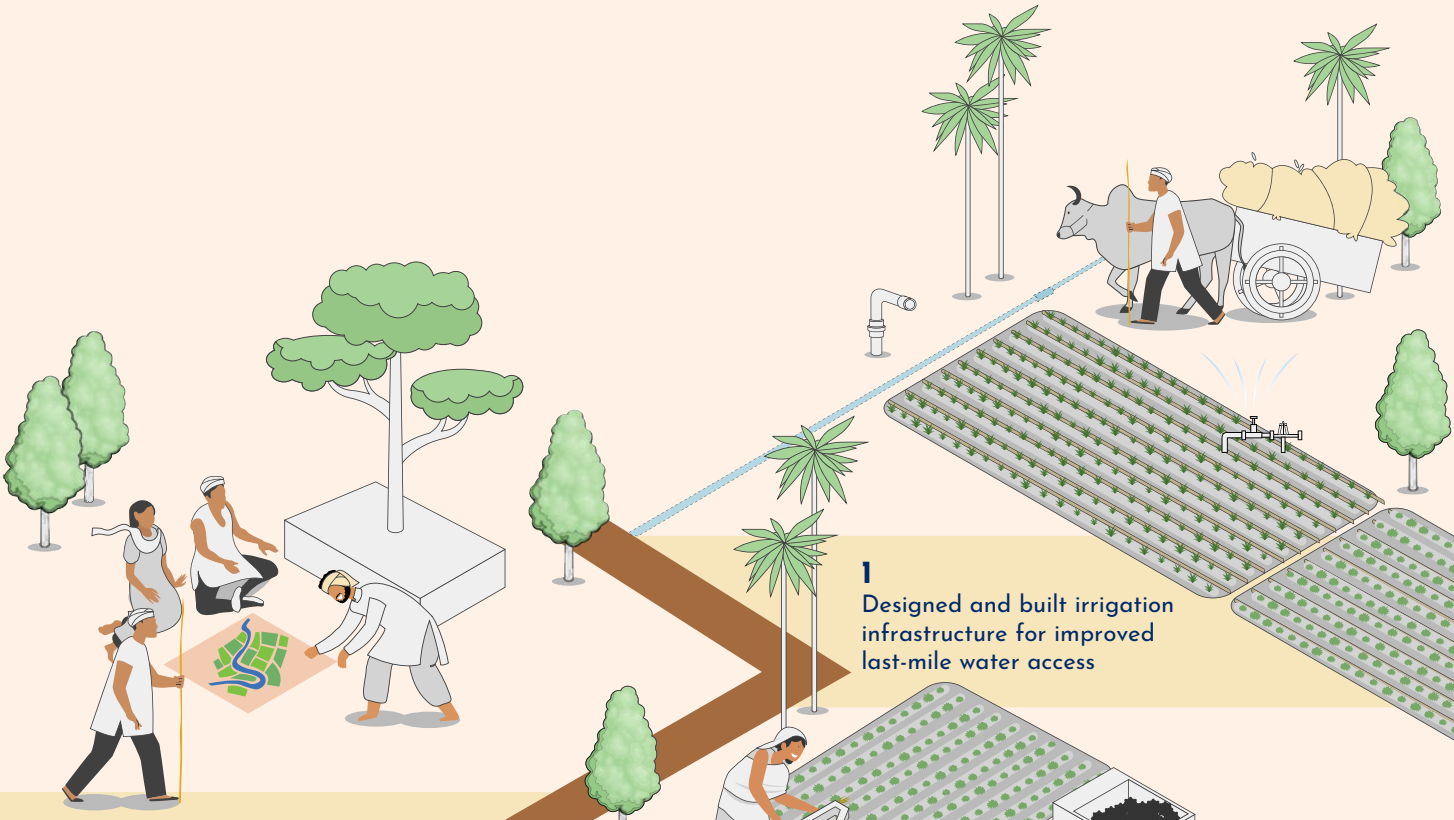
We work across five levers to transform agricultural systems and livelihoods:

1. Irrigation infrastructure
2. Communities' technical capacities with respect to water management
3. Technology and support systems to optimise agricultural labour
4. Access to alternative agricultural inputs
5. Market access

Our partners include the CLARITY project (see details on page 59), Advanced Centre for Integrated Water Resources Management, Prarambha, DCB Bank, Nvidia, IHE Delft Institute for Water Education, SOIL Trust, and Innovation Guild.



Year in Review



1
Designed and built irrigation infrastructure for improved last-mile water access

2
Built community knowledge systems and cooperatives for collective action

3
Put in place technological innovations and support systems to address the labour burden of sustainable agricultural practices and create rural livelihoods

4
Promoted access to alternative agricultural inputs (seeds, pesticides, and fertilisers) to support ecological farming methods

5
Researched pathways to improve market links and make crop diversification economically viable

1 Designed and built irrigation infrastructure for improved last-mile water access

In dryland villages, we

a. Revived a community lift irrigation system in Mandalgudda village, Raichur district, enabling protective irrigation (see Glossary on page 73) over 78 acres.

b. Leveraged investments of ₹32.8 lakh under the Mahatma Gandhi National Rural Employment Guarantee Act to build long-term water storage infrastructure, such as tanks and trench-cum-bunds, in Amarapura (Raichur district) and Chikmyageri (Koppal district). This generated 10,000 days of employment.

Read More | *Why MGNREGA Remains Key for Water Conservation in Raichur*

In Distributary 10 of the Narayanpur Right Bank Canal command area

a. Created digital maps of Distributary 10 and its field irrigation channels to facilitate participatory water planning and pipeline-based irrigation design.

b. Carried out a detailed water budgeting exercise using satellite imagery from the Jaltol web app and Excel models to estimate seasonal water needs.

c. Conducted electronic participatory rural appraisal exercises in Mandalgudda, Mukkanal, and Suladgudda villages to enable farmers to co-design protective irrigation solutions.

d. Planned a pilot for field irrigation channel pipelines in Gandhal village (to be implemented in mid-2025).

Read More | *How Water Shapes the Lives of Farmers in Raichur*

Why Farmers' Control on Canal Water Is Key to Solving Agrarian Distress

Mapping Water: A Ground-Up Approach to Water Governance

2 Built community knowledge systems and cooperatives for collective action

a. Our partner Prarambha registered two water user cooperative societies in Myakaladoddi and Ganadhal villages and supported them through exposure visits, monthly meetings, and structured training at the Water and Land Management Institute (WALMI), Dharwad. These cooperative societies conduct activities such as seasonal crop planning, canal cleaning, and managing infrastructure projects, like the upcoming field irrigation channel pipelines.

b. WELL Labs and Prarambha trained 35 farmers from Devadurga taluk as community hydrologists to promote village-level water planning and crop security (see details on page 61).

c. Co-produced knowledge with farmers through field research and soil health assessments. Soil testing in Raichur and Koppal districts revealed key differences in organic carbon and micronutrient availability. These insights guided training sessions on composting, green manuring, and micronutrient application.

3 Put in place innovations and support systems to address the labour burden of sustainable agricultural practices and create rural livelihoods

a. Conducted a study on the labour requirements of different crops grown in Devadurga.

It highlighted that sustainable agriculture cannot succeed without addressing its significant labour demands—a burden that falls disproportionately on women.

b. Prarambha supported 159 women labourers in four villages with training and fair compensation for line-planted paddy transplantation.

Participants reported that it led to income improvements and reduced physical strain as compared to conventional methods.

c. Identified and trained 19 village-level entrepreneurs in the operation, maintenance, and rental of farm machinery.

The goal is to enable them to set up custom hiring centres in 2025–2026, through which they will provide labour-saving technologies for weeding, input application, and harvesting, particularly for diversified cropping systems like Akkadi Saalu.

Our study on labour barriers informed the design of custom hiring centres as farmer-run micro-enterprises.

Read More | *Addressing the Labour Barrier in the Transition to Crop Diversification*

4 Promoted access to alternative agricultural inputs (seeds, pesticides, and fertilisers) to support ecological farming methods

1. Supported the formation of a bio-resource centre in Amarapura gram panchayat.

   a. The centre produces and sells liquid manure such as Jeevamrutham (fermented mixture of cow dung, cow urine, jaggery, flour, soil, etc.) and Panchagavya (made of cow milk, urine, dung, ghee, and curd), along with seed kits for the Akkadi Saalu cropping system.

   b. More than 200 farmers accessed seeds from the community-managed centre in both kharif and rabi seasons.

   c. Over 70 farmers adopted the use of liquid manure.

2. Trained community members, including 23 women, in Mukkanal and Mandalgudda villages (Raichur district) and Malakasamudra and Chikmyageri villages (Koppal district) to run bio-resource centres.

Our partnership with WELL Labs is a powerful example of how grassroots organisations and technical institutions can collaborate to drive meaningful change. WELL Labs' expertise in designing science-based programmes and our close relationships with communities and work on the ground have enabled us to address critical challenges in water access and sustainable agriculture.

Together, we have strengthened water user cooperative societies, supported farmer-led planning, and helped farmers adopt practices that improve productivity while conserving natural resources.

Prarambha
Civil Society Organisation
Raichur

5 Researched pathways to improve market links and make crop diversification economically viable

A major barrier to agroecological transitions is the absence of reliable markets for non-paddy crops, making crop diversification unremunerative.

Our research into farmer-trader dynamics in Raichur's mandis (agricultural markets) revealed the heavy toll of informal credit networks, transportation bottlenecks, and quality-related rejections. These insights have informed our strategy to federate water user cooperative societies and village-level institutions into farmer collectives to oversee the aggregation and storage of agricultural produce as well as value addition.

Prarambha supported a few farmers in piloting off-farm income strategies—poultry, compost production, etc. Diversifying farming incomes is critical to ensuring that agricultural transitions also improve people's quality of life.

Read More | *Crop Diversification: A Win-Win for Farmers and the Environment*

Policy Brief: Augmenting Farmer Income With On-Farm Carbon and Water Trade-Offs

What We Learnt

1

Farmers value irrigation reliability over quantity

Many farmers at the head-end of the canal expressed interest in switching to diversified cropping systems from paddy monocultures as long as water delivery remains predictable. This is remarkable considering how entrenched the paddy-cultivation ecosystem has been in the region since the introduction of canal irrigation. Our crop diversification pilots, electronic participatory rural appraisal exercises, and irrigation planning also reinforced that farmers prefer assured water supply and control over irrigation over receiving excess water from canals.

2

Farmers are willing to invest their own money to overcome irrigation challenges

In Mandalgudda, farmers voluntarily contributed ₹2,000 per household to revive a broken lift irrigation system. This indicates that good facilitation and trust-building can often be more critical than funding. It also highlights the confidence farmers have placed in our grassroots partner, Prarambha, and in the technical inputs regarding the design, work plan, and budgetary estimates that WELL Labs provided.

3

Technical soundness, local ownership, and stakeholder alignment can facilitate innovation in government systems

The ongoing pipeline pilot under the Distributary 10 project highlights that innovation is possible in rigid government systems.

Our water-sharing initiatives come at a time when the Government of Karnataka is prioritising canal automation and pipeline-based irrigation water control. We are working with officials from two government bodies—the Krishna Bhagya Jala Nigam Limited and Advanced Centre for Integrated Water Resources Management—to ensure that policies provide an enabling environment for equitable water-sharing among head-end and tail-end farmers in canal command areas.

More recently, the Government of India approved the modernisation of irrigation water supply networks. It aims to create robust backend infrastructure for micro-irrigation, with underground pressurised piped irrigation, real-time data, and Internet of Things technologies for water accounting and management. It also seeks to handhold water user cooperative societies in managing irrigation assets.

Our collaboration with WELL Labs on the Remote Sensing for Communities programme has helped bring research closer to practice and bridged policy frameworks with field realities.

WELL Labs has co-designed and implemented socially rooted interventions, such as reviving last-mile irrigation infrastructure and increasing community capacity through initiatives like the community hydrology programme. ACIWRM has leveraged data for communities through farmer water schools and strengthened water user cooperative societies.

This partnership demonstrates how government departments, research institutions, community organisations, and field-based innovation ecosystems can work together to build more resilient farming communities and promote equitable water management.

Dr P Somasekhar Rao
Director (Technical)
Advanced Centre for Integrated Water Resources Management (ACIWRM)

4

Technological innovations alone cannot reduce the labour burden of agriculture

Our study on agricultural labour revealed the two biggest sources of drudgery: manual weeding and harvesting. These tasks are physically exhausting, time-consuming, and disproportionately borne by women.

While farmers are eager to adopt labour-saving tools, they want local service providers—not distant, unfamiliar suppliers. Our pilot entrepreneurship programme showed that with basic training, community members can build viable enterprises that design, sell, rent, or repair agricultural equipment.

Thus, labour-saving innovations are not just about building or providing machines. They also involve setting up trusted local systems for access, support, repair, and entrepreneurial training.

5

Reliable alternatives can help farmers move away from the intensive use of synthetic pesticides and fertilisers

While many want to move away from input-intensive conventional agricultural practices, the availability of and access to alternatives remain barriers. Most local shops are dominated by paddy/cotton input ecosystems, with little support for alternative agricultural inputs.

However, only training farmers in sustainable practices is not enough to ensure the adoption of alternatives. Asking them to do the additional work of collecting environmentally friendly materials and preparing liquid manure will not show results when they can easily buy synthetic inputs from nearby stores. Instead, what works is training a separate group of service providers—landless or smallholder farmers, youth, women, etc.—to reliably produce, package, and deliver alternative inputs. However, such community input systems must rely on paid, skilled service providers rather than volunteers.

Women are especially well-suited to run bio-resource centres. Although they do the bulk of agricultural work, their contribution is often underpaid or not recognised. Bio-resource centres can provide them with steady employment, fair wages, and community recognition. The work is also rooted in their traditional knowledge of seed conservation and soil health management. Many women wanted to produce alternative inputs and preserve local seeds not just for economic reasons but also to support nutrition security and long-term soil regeneration for the benefit of their families and communities.

6

Collectives can ensure that farmers get better prices for their produce

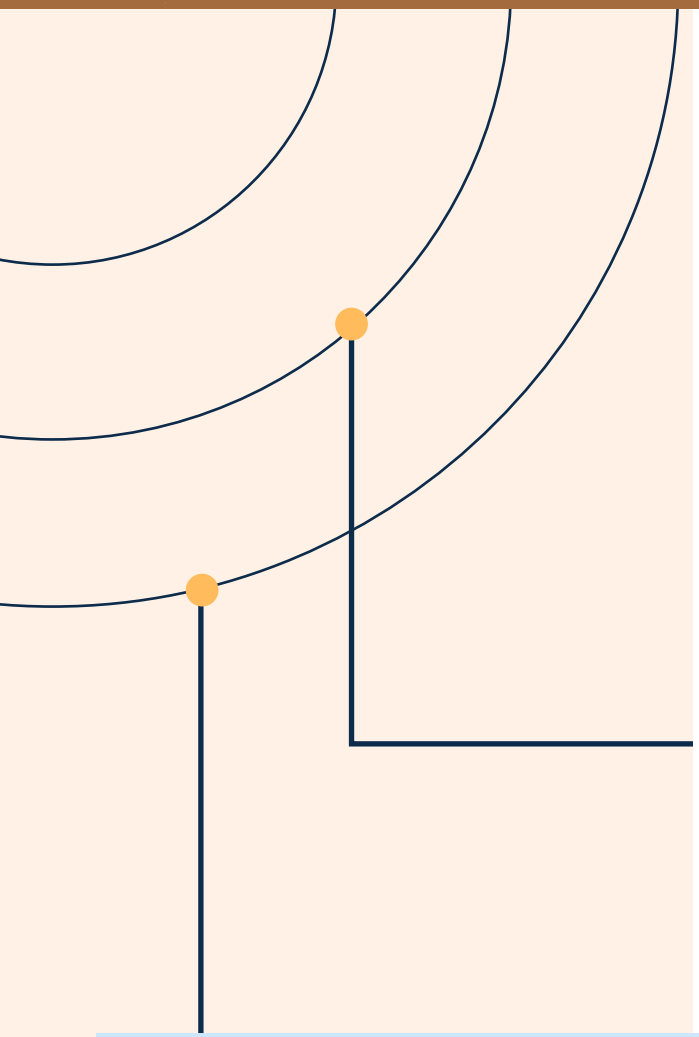
Our journey-mapping exercise revealed that many farmers remain locked into informal credit arrangements with traders, forcing them to sell under distress. As a result, they often get poor prices for their harvest and are exposed to supply chain uncertainties. The entire system externalises risk onto farmers while limiting their control and bargaining power.

Farmer producer organisations can offer a viable alternative. They can manage aggregation, grading, and market access, and help farmers retain a greater share of the final value of their produce. Thus, market transformation requires not just better transport and storage facilities but also farmer collectives to make it equitable.

The Way Forward

Over 2025–2026, we shall consolidate our on-ground learnings and deepen systems change across irrigation infrastructure, governance, agricultural inputs, labour, and markets.

Our goal is to anchor the Raichur Transformation Lab (see details on page 61) as a replicable model for socially just transitions in water and agriculture, with a focus on equitable water access, ecologically sound land use, and diversified agricultural incomes.



1. Scale irrigation infrastructure for improved last-mile water access

In Distributary 10, Narayanpur Right Bank Canal

a. Complete the construction of the first field irrigation channel pipeline in Distributary 10 and make it operational.

b. Finalise budgets and build seven additional field irrigation channel pipelines.

c. Institutionalise water budgeting and electronic participatory rural appraisal tools in water user groups to guide real-time irrigation decisions.

In the dryland villages of Mandalgudda, Mukkanal, and Suldagudda

a. Expand protective irrigation over 200 acres through collective borewell sharing, community lift systems, and tank revival.

b. Develop a comprehensive crop and water security plan to overcome periods of water stress. The plan will integrate surface water, groundwater, and soil moisture using digital and remote sensing tools like Jaltol.

2. Strengthen community knowledge systems and cooperatives for collective action

a. Set up water user groups in Ganadhal and Myakaladoddi as training hubs for other tail-end villages. We shall formalise water distribution protocols and irrigation scheduling, and build infrastructure maintenance capacity.

b. Scale the community hydrologist programme to five villages in canal-command areas and three outside, with at least 10 youth trained in groundwater monitoring, canal flow tracking, and crop water budgeting. These young professionals will be embedded in local institutions to ensure that scientific insights support everyday farm decisions.

c. Convene a series of cross-departmental meetings in Raichur district with the Command Area Development Authority, Krishna Bhagya Jala Nigam Limited, Advanced Centre for Integrated Water Resources Management, and panchayats to secure policy alignment and infrastructure convergence.

3. Promote agricultural mechanisation and build enterprise-driven livelihoods

a. We shall pilot a custom hiring centre and incubate 10–15 village-level entrepreneurs to reduce the drudgery involved in diversified cropping systems like Akkadi Saalu.

The centre will offer mechanised weeding, spraying, harvesting, and sowing services for over 300 acres in 10 canal and dryland villages. They will be run by local entrepreneurs, especially women and landless youth.

b. Provide training on tool maintenance, pricing models, and cooperative ownership structures for the custom hiring centres.

c. Conduct a technology assessment to explore the performance and suitability of electric weeders, seed drills, and transplanters in rainfed plots.

d. Continue our research on agricultural labour, with a focus on quantifying the time saved through mechanisation, changes in wages, and improvements in worker safety and productivity.

4. Institutionalise low-cost, village-scale input systems that reduce the dependency on external vendors and encourage ecological stewardship

a. Enable 3–5 women-run self-help groups to provide inputs across canal command and dryland villages.

They will serve over 500 farmers, supplying regenerative inputs like Jeevamrutham, Panchagavya, green manure seed kits, and native seed varieties suitable for mixed cropping.

b. Our entrepreneurship support will include credit facilitation, branding for local agricultural inputs, and monthly production calendars aligned to crop cycles.

Each bio-resource centre will be mapped to a gram panchayat and integrated into Mahatma Gandhi National Rural Employment Guarantee Act/National Rural Livelihoods Mission convergence plans (see Glossary on page 73), where feasible.

5. Build aggregation and value addition systems to fetch better prices for produce

From May to July 2025, we shall conduct a study on existing crop value chains and market systems in Raichur. Based on the insights, we shall formulate strategies to increase farmers' share in the market value of crops, especially pulses, cotton, groundnut, and oilseeds. Our roadmap is as follows:

a. Aggregate harvested produce through farmer producer organisations.
These organisations will manage logistics, quality control, and collective marketing. They will be equipped with post-harvest infrastructure, such as solar dryers, moisture meters, and storage and grading facilities. These help reduce post-harvest losses, improve price realisation, and reduce the dependency on intermediary agents and informal creditors. They also play a key role in bundling inputs, finance, and market contracts to help farmers negotiate better terms and prices.

b. Establish post-harvest hubs as micro-enterprises managed by women and the youth.

I. These entrepreneurs will offer services such as procurement, sorting, grading, and packaging, supported by digital tracking and standardised pricing.

II. We shall train entrepreneurs and incubate post-harvest hubs through a proposed 'rural MBA programme' that trains a network of micro-enterprise consultants using the National Rural Livelihood Mission's framework for enterprise-building.

6. Pilot water governance and agroecological models in the groundwater-dependent Chikkaballapur district

This presents a fresh opportunity to explore groundwater collectives, climate-informed crop planning, and service-based agri-enterprises tailored to the ecological and social dynamics of this semi-arid region. We shall kickstart our work in Chintamani block and then expand to other blocks.

Our pilot projects will focus on:

a. Socially inclusive groundwater security systems designed to provide protective irrigation to farmers without borewells.

b. Infrastructure for shared water use, including pipes and pumps, managed by emerging borewell water user cooperative societies.

c. Water budgeting tools developed through participatory rural appraisal techniques and digitisation.

We shall also test the following village-based service models:

a. Training community hydrologists so that they can offer irrigation-planning support.

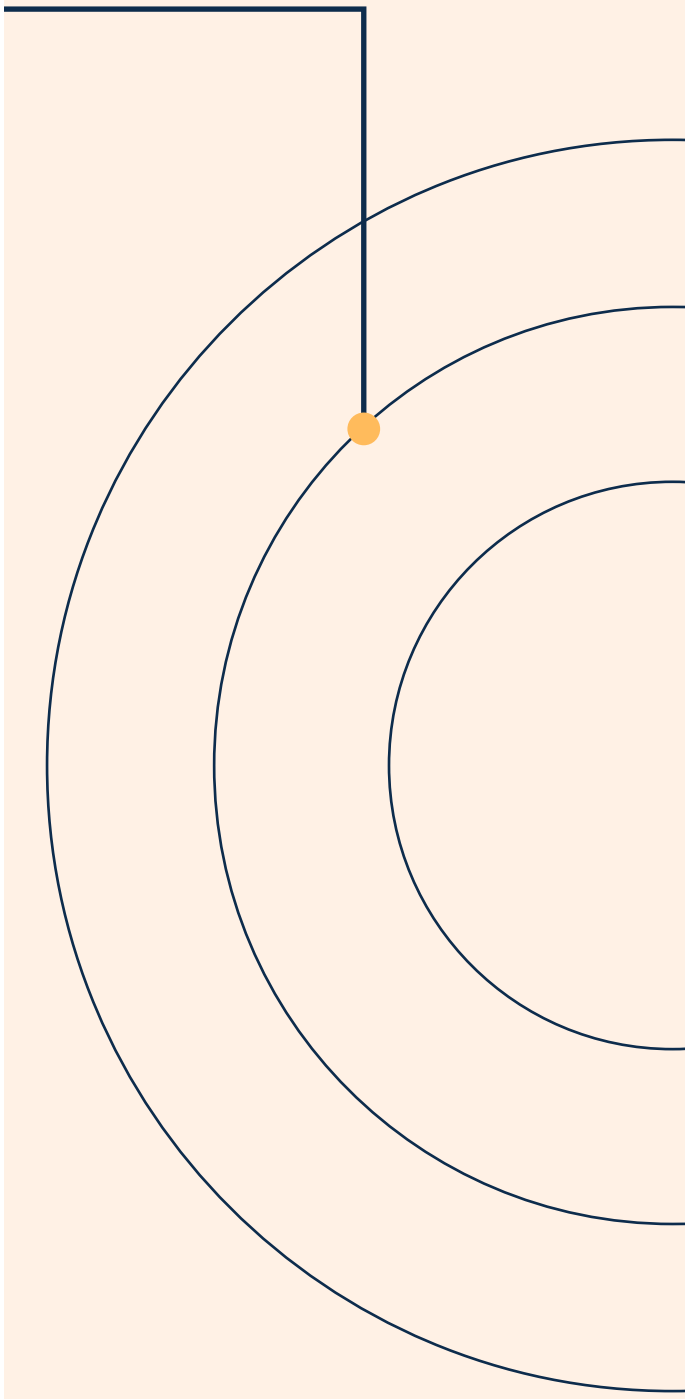
b. Village-level entrepreneurs who can offer mechanised weeding, spraying, harvesting, and sowing services.

c. Bio-resource centres for alternative agricultural inputs and to preserve native seeds.

To inform policies and interventions, we shall conduct two studies:

a. Evaluating the impact of water from Hebbal-Nagawara Valley lakes (where a part of Bengaluru's treated wastewater is discharged) on soil and crop health. The results will be used to design safe use protocols for treated wastewater in agriculture

b. Comparing the impact of using tanks for irrigation versus using them for groundwater recharge to better inform rural water management interventions.

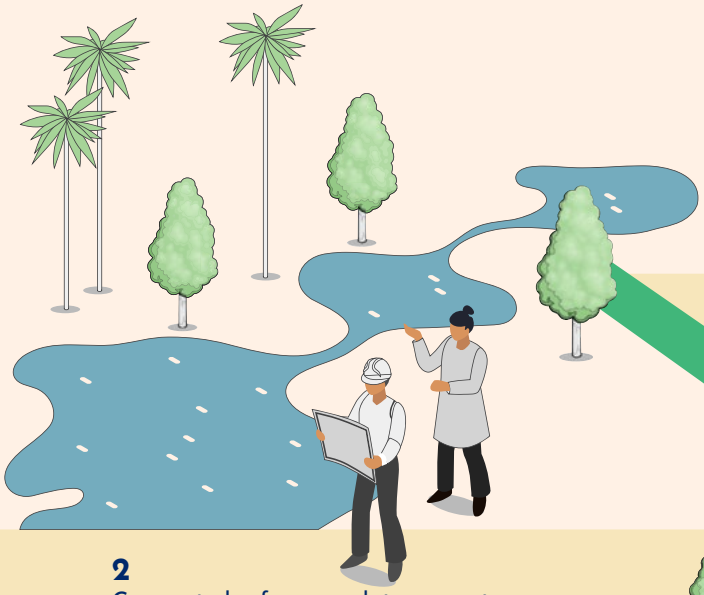


Urban Water

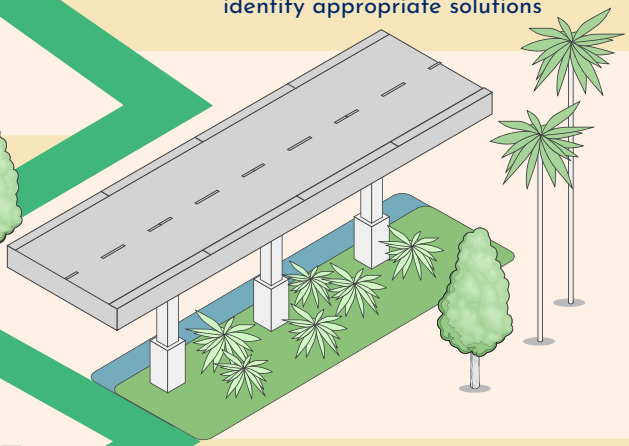
The Urban Water programme designs pathways towards water-secure and resilient cities using water circularity and nature-based solutions. We work with governments and citizen interest groups to provide the knowledge base for policy and decision-making. We also build coalitions between diverse stakeholders, including governments, market players, and civil society groups, to harness the power of collective action for tackling urban water challenges.

Year in Review

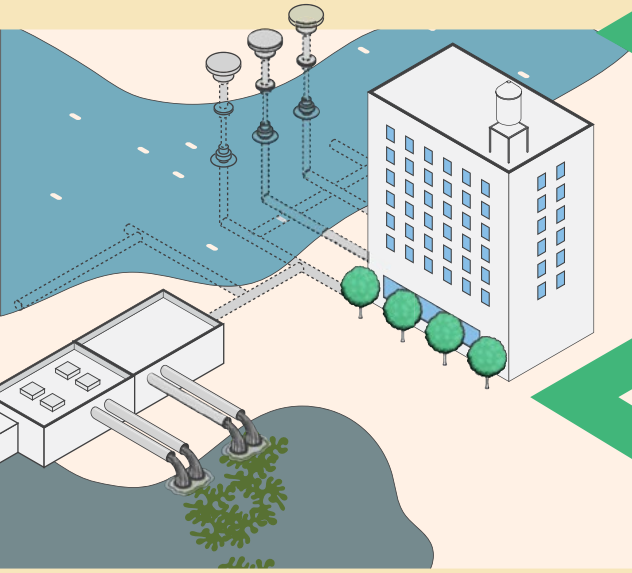
1
Built a framework to diagnose urban water challenges and identify appropriate solutions



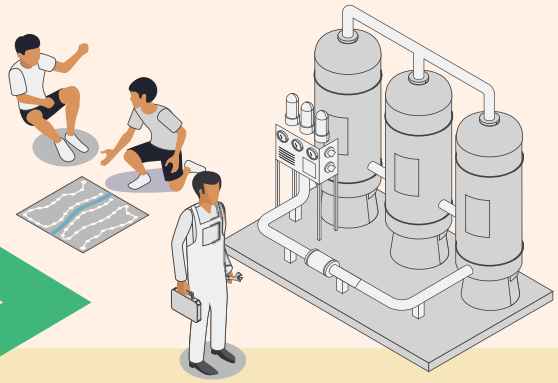
2
Co-created a framework to promote scientific lake rejuvenation



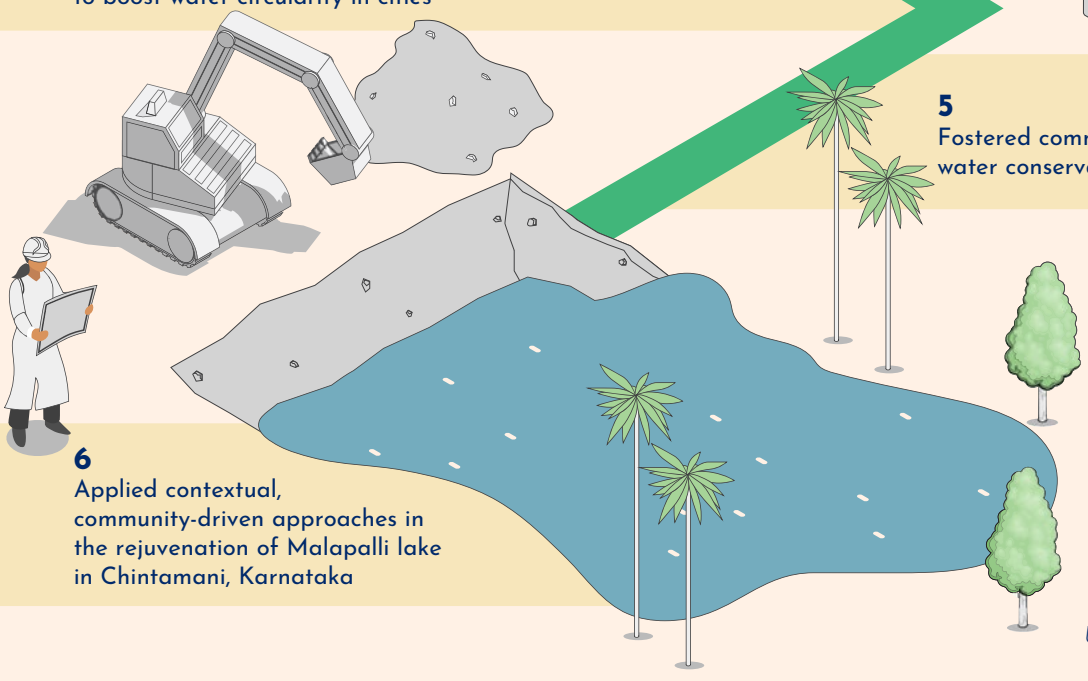
3
Researched the barriers to mainstreaming nature-based solutions for water management



4
Researched and facilitated pathways to boost water circularity in cities



5
Fostered community engagement for water conservation



6
Applied contextual, community-driven approaches in the rejuvenation of Malapalli lake in Chintamani, Karnataka

1 Built a framework to diagnose urban water challenges and identify appropriate solutions

1. Evaluated the efficacy of different water balance methods and built a framework for a detailed and robust assessment of water balances.

2. Developed a system to diagnose water-related threats in an area and suggest location-specific blue, green, and grey infrastructure solutions.

2 Co-created a framework to promote scientific lake rejuvenation

Partners: Bruhat Bengaluru Mahanagara Palike (BBMP), DCB Bank, Friends of Lakes

We co-created a scientific lake rejuvenation framework and conducted a workshop to refine it. We then opened up the framework to others—over 100 organisations and individuals have shown interest in collaborating on it.

Read More | *Framework for Scientific Lake Rejuvenation*

BBMP's Lakes Department has worked with WELL Labs, among other partners, to co-create a framework for lake rejuvenation. This has been integrated into the Bengaluru Climate Action Plan's Standard Operating Procedures for its Blue-Green Infrastructure Network.

WELL Labs blends science with insights from the ground to tackle urban water issues effectively. The department appreciates their skill of simplifying technical ideas into clear visuals and actionable plans.

Smt. Preeti Gehlot, IAS
Special Commissioner (Forest, Environment, and Climate Change Management)
BBMP

3 Researched the barriers to mainstreaming nature-based solutions for water management

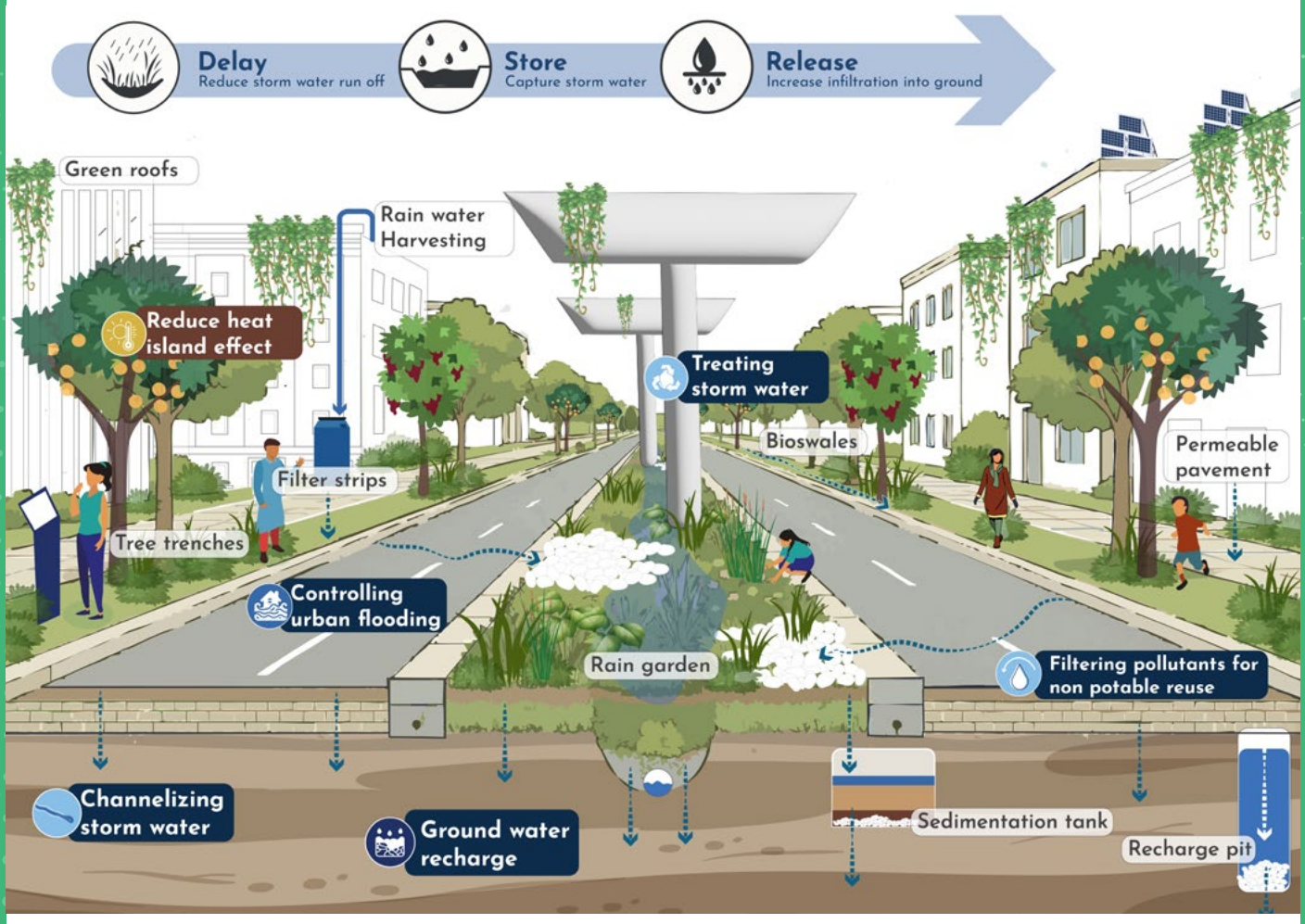
Partners: Oak Foundation, India Forum for Nature-Based Solutions, Rocky Mountain Institute

1. Developed a compendium of nature-based solutions for stormwater capture and run-off reduction in the Indian context.

2. Mapped the enablers and barriers to the adoption of nature-based solutions in India, including policies, financing, and technical capacity.

This project will conclude in June 2025 and the findings will be published as a report.

Read More | *Building Climate-Resilient Cities with Nature-Based Solutions*



Nature-based solutions in urban landscapes can alleviate flooding and the heat island effect

4 Researched and facilitated pathways to boost water circularity in cities

Partner: Gates Foundation

a. Studied the potential for the adoption of decentralised sanitation technologies in residential apartments in Bengaluru and Chennai.

We mapped new buildings, urban growth trends, and the amount people pay for sanitation facilities. Our findings reveal that these cities can potentially be large markets for innovative sanitation systems.

Partner: Swiss Federal Institute of Aquatic Science and Technology

b. Conducted a study on decentralised sewage treatment plants in Bengaluru.

It revealed critical issues like poor functionality, inconsistent water quality, a lack of standardisation in systems, and a lack of acceptable wastewater reuse options. We also found that the economic viability of these systems is closely tied to their scale, indicating the need for high-quality, automated, "plug and play" solutions, especially for small-scale applications.

c. Mapped sites in Bengaluru where treated wastewater can potentially be reused.

Treated wastewater can be reused in industries, construction sites, infrastructure projects, green patches, and lakes. The mapping of reuse options is critical as currently, a significant portion of the city's wastewater treated in decentralised plants is discharged into stormwater drains rather than reused or sold. A market for treated wastewater could also help buildings garner the financial resources to upgrade their sewage treatment plants and increase water availability in the water-stressed city.

d. Developed three scenarios for how decentralised water treatment and reuse could evolve over the next decade.

In September 2024, we organised a stakeholder workshop to drive consensus around the scenarios, foster collaboration between diverse stakeholders, and identify priority steps to improve water security in Bengaluru.

Read More | *Bengaluru Has the Highest Number of Decentralised Sewage Treatment Plants Globally. Are They Effective?*

Grey to Blue: What Can Bengaluru Learn From Chennai on Tertiary Treatment of Wastewater

We collaborated with WELL Labs under Columbia University's initiatives on the topic 'We Stand in a Crisis with Water'. As one of the key organisations working to resolve water issues in Bengaluru, WELL Labs has enlightened our research with insights about the city's water challenges and the complex dynamics underpinning them.

Dr Sandro Marpillero
Adjunct Associate Professor
Columbia University

Workshop: Drafting Future Development Scenarios for Decentralised Water Reuse in Bengaluru, September 2024

Workshop on the Lake Restoration Framework, Bengaluru, March 2025

5 Fostered community engagement for water conservation

Partner: Bangalore Water Supply and Sewerage Board (BWSSB)

Evaluated applications for BWSSB's Green Star Challenge, a competition to acknowledge and promote communities' and institutions' water conservation efforts in Bengaluru. We surveyed over 500 residential, commercial, and institutional buildings, assigned ratings to them, and documented the challenge's outcomes in a report.

Read More | *How Can We Engage Communities to Conserve Water in Bengaluru?*

6 Applied contextual, community-driven approaches in the rejuvenation of Malapalli lake in Chintamani, Karnataka

Partners: Chintamani City Municipal Council, DCB Bank, Friends of Lakes

The rejuvenation project is transforming a degraded urban lake into a vibrant ecological and social commons through contextual, community-driven approaches. Under the project, WELL Labs and its partners:

a. Conducted a topographic survey.
b. Constructed a bund around the publicly owned part of the lake.
c. Diverted sewage that was previously flowing into the water body.
d. Built stabilisation ponds to remove sediments from the water flowing in from the lake's catchment.

The Urban Water programme's research on fostering water security in Chintamani laid the scientific groundwork for the project. While the town is highly dependent on groundwater, many borewells are failing. In this scenario, Chintamani's numerous lakes can go a long way in fulfilling residents' water needs, as long as they are free from encroachments and pollution.

The restoration began in December 2024 and will conclude in July 2025.

Read More | *Webinar on Water Security in Karnataka's Small Towns: 5 Key Learnings*

What We Learnt

1

The lack of data regarding urban nature-based solutions in the Indian context is a major barrier to their widespread adoption

Nature-based solutions, such as parks, ponds, green buildings, and green stormwater infrastructure, have shown significant benefits, such as reducing the urban heat island effect, managing floods, improving groundwater recharge, restoring degraded ecosystems, conserving biodiversity, and creating recreational public spaces.

While there is data regarding these interventions in China and Singapore, among other regions, there is limited data from the urban Indian context. Thus, urban planners, architects, builders, or municipalities find it difficult to quantify the benefit provided by an NbS intervention and the scalability of those benefits, that is, the point at which the NbS system will saturate and not provide the same benefits as it did when the project was initiated.

This data gap also deters the private sector and philanthropies from funding nature-based solutions. Commercial investors require clear, quantifiable data on financial returns and risk profiles. The lack of data on the financial performance and market rates of nature-based solutions means they are perceived as high-risk and low-return compared to conventional alternatives. Philanthropic funders often seek evidence of social, environmental, and economic impacts to justify their investments. In this case as well, the absence of reliable data makes it difficult for them to assess the effectiveness and scalability of their contributions.

Thus, despite their potential, nature-based solutions often struggle to attract sufficient investments. Currently, the majority of funding comes from the government.

2

Financial incentives, such as tax breaks and subsidies, can strengthen efforts to engage communities in water conservation

Initiatives like the Bangalore Water Supply and Sewerage Board's Green Star Challenge are crucial to engage communities in water management, promote the adoption of water-saving fixtures, and increase awareness about urban water challenges and solutions.

While acknowledging and commending water-saving practices by assigning high ratings to good performers is important, it is just the first step. Offering tax breaks or subsidies to organisations or buildings with higher ratings could encourage more entities to participate in the challenge and implement water-conservation initiatives. Financial incentives can also motivate organisations and residents to invest in sustainable technologies that might otherwise be prohibitively expensive.

3

Luxury homes in water-scarce areas are the most likely early adopters of innovative decentralised sanitation solutions

A transition to decentralised sanitation systems can be challenging because the choice of technology is inherently consumer-driven (as opposed to large institutions, such as municipalities, which are more likely to opt for centralised technologies since they would be more cost-effective due to economies of scale). This necessitates a market-driven strategy. To enable this, we need to identify different market segments and map them to suitable solutions, while also factoring in socioeconomic contexts and cultural practices.

Innovative sanitation solutions like Reinvented Toilets are quite expensive. However, their advantage is that they generate clean (near potable) water and ash that is relatively cheap to dispose of. The costs could decrease significantly with an increase in the market size and eventually enable complete water circularity.

It is expected that luxury homes in areas with high water scarcity would be early adopters of innovative technologies, as their residents would have the means to pay for these expensive systems to secure their water availability.

Therefore, focusing on high-end markets in large metropolitan areas could eventually help transform sanitation systems at scale.

4

Water credits can help finance water-management interventions in the same manner that carbon credits have funded sustainability initiatives, such as renewable energy and carbon capture

While carbon credits are well-established for nature-based solutions, they apply only to projects with direct carbon sequestration potential, such as forest conservation. Water savings are not part of their calculus. To bridge this gap, we need a water credits system to quantify the water savings from nature-based solutions, which will help finance such interventions.

Water credits represent a specific amount of water that has been either conserved or produced. These credits can be traded between entities experiencing water shortages and those with a surplus. While the idea of water credits is comparable to that of carbon credits, a key difference is that, due to the localised nature of water resources, transactions must be confined to the same hydrological unit, such as a river basin or watershed.

The stormwater retention credits (SRC) system, implemented in Washington, DC, is a good example of a water credits system. Since its inception, the programme has facilitated the sale of over 1.7 million credits, equivalent to capturing and treating more than 40 million gallons of runoff annually. Beyond its environmental impact, the initiative has contributed to the establishment of green spaces, improved water quality, and created green jobs, while also attracting more than $1.7 million in private investment.

The Way Forward

1. Build tools to identify evidence-based solutions for urban water challenges

Partner: National Institute of Urban Affairs

a. We shall embed our water balance creation framework into the Atal Mission for Rejuvenation and Urban Transformation (AMRUT). This framework will provide cities with a holistic picture of their water flows, enabling them to formulate more effective water management strategies.

Partner: BBMP

b. We shall codify our system to diagnose water-related threats and suggest location-specific blue, green, and grey infrastructure solutions into a Python model and web tool. Municipalities and philanthropic initiatives can use this tool to implement evidence-based solutions for water resilience.

2. Embed scientific lake rejuvenation methods in national policies

Partner: National Institute of Urban Affairs

To promote scientific lake rejuvenation methods, our lakes framework will be embedded into the Ministry of Housing and Urban Affairs' national guidelines.

3. Integrate nature-based solutions into the design of stormwater drains in Bengaluru

Partner: BBMP

BBMP is one of the implementing agencies for a World Bank-funded project to improve water security and resilience in the city. WELL Labs is part of the Socio-Environment Coordination Cell within the BBMP for the integration of nature-based solutions and a solid waste action plan under the World Bank project.

4. Implement strategies to boost water circularity

Partner: Gates Foundation

a) We shall research the challenges urban sanitation systems face and residents' willingness to pay for innovative decentralised sanitation technologies in Chennai, Bengaluru, Tiruchirappalli, and Mangaluru.

Partner: Bangalore Water Supply and Sewerage Board

b) We shall design, monitor, and evaluate a pilot trial to fill lakes with treated water from residential apartments' decentralised sewage treatment plants in order to boost groundwater recharge in Bengaluru.

Partner: Indian Institute of Technology Madras

c) We shall develop a framework to evaluate and select sewage treatment plants for different contexts. We shall also investigate the quality parameters that treated wastewater must meet for its reuse in construction.

5. Foster community engagement for water conservation

Partner: Bangalore Water Supply and Sewerage Board

We shall refine the evaluation criteria for the next edition of the Green Star Challenge and evaluate the applications for it.

6. Research and develop strategies to further improve water security in Chintamani

Beyond the Malapalli lake restoration, we shall:

a. Study the impacts of lake rejuvenation on the town's water security.

b. Research the potential of rainwater harvesting in Chintamani.

c. Study the infiltration rates in groundwater recharge pits in the town and accordingly develop strategies to improve groundwater levels.

d. Explore progressive pricing strategies to ensure that households with low water use do not subsidise those who use more water. Our surveys showed that a majority of households used between 45–70 litres per person per day (lpcd), while 30% of the surveyed population consumed around 100–175 lpcd.

e. Identify adequate sanitation and wastewater treatment systems for different parts of the town.

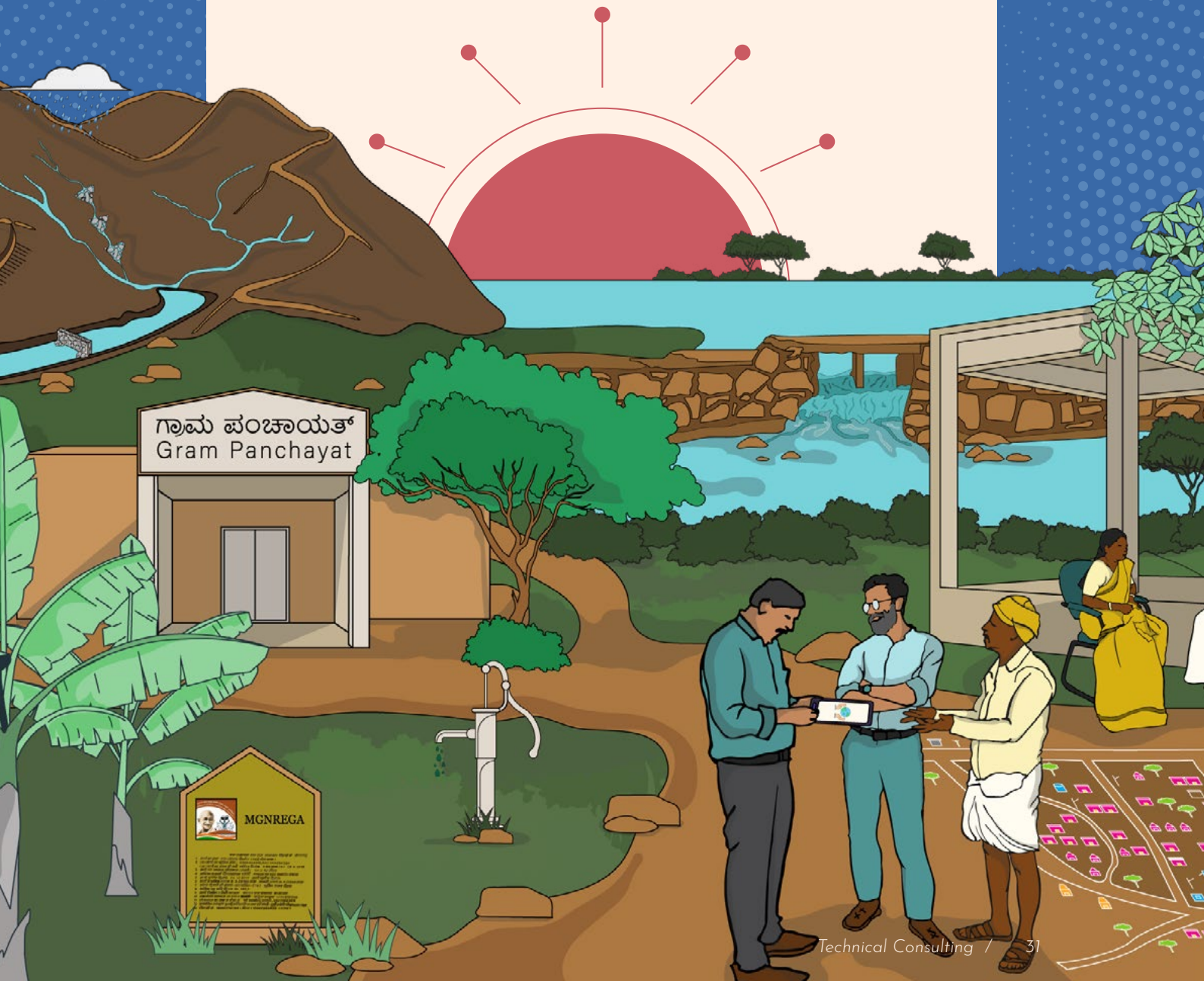
f. Conduct a water journalling study in Chintamani's slum settlements to better understand water access, sanitation conditions, and household coping strategies with respect to water scarcity.

The water sector in India is complex and dynamic. It requires extensive policy, programming, and implementation-related inputs to yield economic benefits while fostering equity and justice. WELL Labs is helping build a water-secure India by providing rigorous scientific insights.

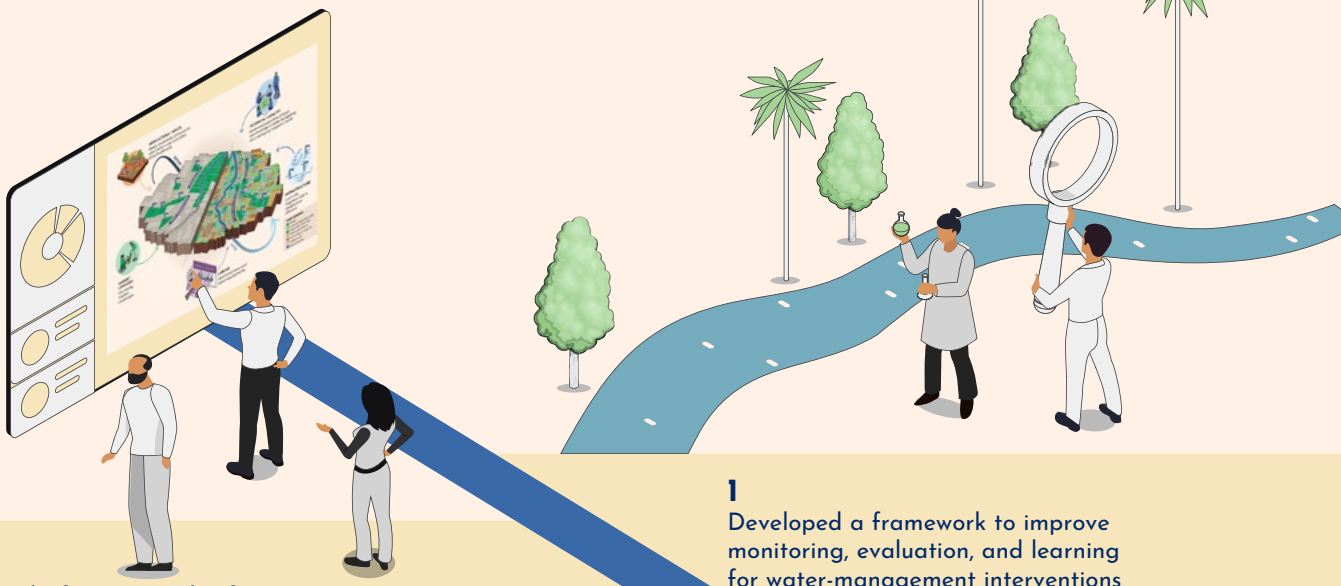
Mr Vishwanath S
Director
Biome Environmental Solutions

Technical Consulting

The Technical Consulting programme enables better decision-making in the natural resources management sector through data and tools. It works with philanthropic organisations and NGOs to improve their monitoring, evaluation, and learning systems. It is also developing simple, accurate, and easy-to-measure water security indicators for the sector and providing advisory services to government agencies on water systems management.

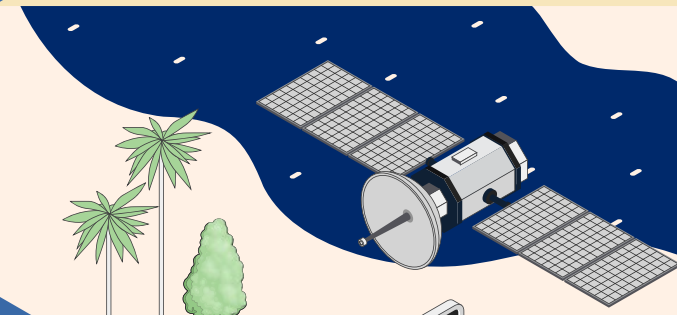


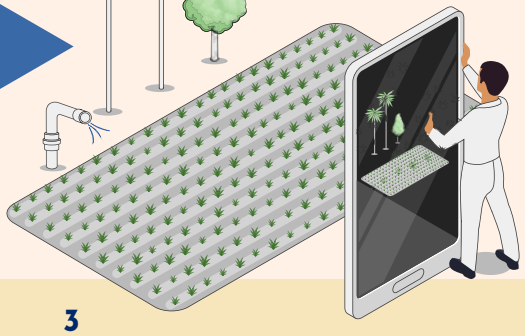
Year in Review



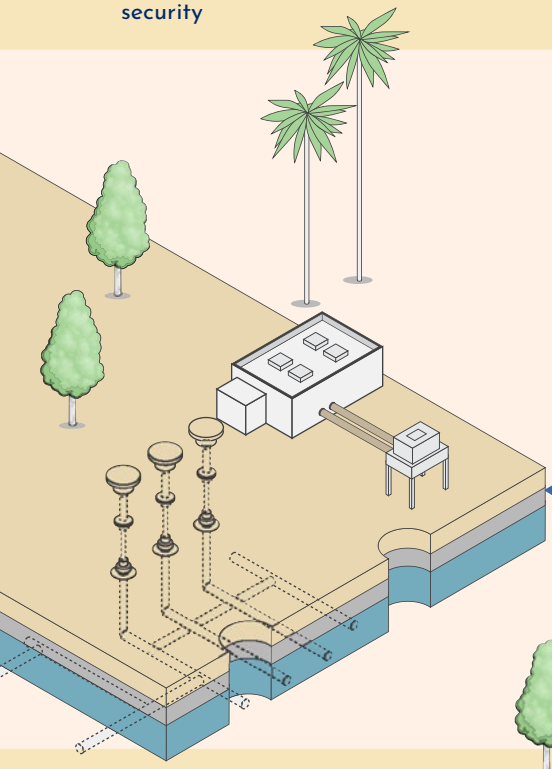
1
Developed a framework to improve monitoring, evaluation, and learning for water-management interventions

2
Co-created a draft Water Index for Sustainability, Equity, and Resilience (WISER) framework to assess water security





3
Prototyped digital public tools and datasets for water-management interventions



4
Developed a source sustainability strategy for Jal Jeevan Mission Assam

1 Developed a framework to improve monitoring, evaluation, and learning for water-management interventions

To address the increasing water stress in India, organisations are developing new solutions and expanding existing ones. Our MEL programme focuses on finding what works and what does not in different contexts.

1.1 Evaluation of groundwater-recharge pits in Maharashtra

Partners: Environmental Defense Fund, Save Groundwater Foundation

This project evaluated groundwater-recharge pits in the drought-prone district of Jalna in Maharashtra. The intervention sought to overcome waterlogging during the monsoon and water scarcity in summer.

Evaluation findings

The waterlogging was not due to the clayey black soil acting as an impermeable layer. Rather, aquifers in this region are thin and fill up quickly, leading to the saturation of the soil in the rainy season. Moreover, groundwater quickly flows downstream as subsurface discharge in spring, leading to scarcity in summer.

The recharge pits provided no value addition as, at a watershed scale, water table dynamics were independent of the intervention. Water movement followed the topography and ridges ran out of water faster than the valleys.

Read More | *Monitoring and Evaluation of Recharge Pits in Jalna, Maharashtra*

1.2 Evaluation of groundwater collectivisation in Andhra Pradesh

Partners: Environmental Defense Fund, WASSAN

We evaluated the impact of WASSAN's groundwater collectivisation programme. It promotes sustainable groundwater management and water-sharing between farmers through a common pipeline network managed by water-user associations. This helps farmers without borewells access protective irrigation, that is, get enough water to secure their crop, during the kharif season (roughly June to October). The biggest benefit for farmers with borewells was being able to irrigate their fragmented landholdings far from their wells.

Evaluation findings

Through primary data collection across 12 treatment and 12 control villages, we found that farmers in intervention areas had significantly better water access. Consequently, the cropping intensity, yields, and profits were higher.

However, the intervention was not as impactful in terms of sustainability. The treatment group adopted somewhat more water-efficient crops and dug borewells at a slower rate. Groundwater decline and borewell failure increased similarly across both groups, primarily because the intervention areas were small.

Read More | *Impact Assessment of a Groundwater Collectivisation Project*

1.3 Evaluation of the planning of water-conservation structures in Karnataka

Partners: Arghyam, Environmental Defense Fund, Foundation for Ecological Security

We evaluated Arghyam's technical support programme to improve the planning of water-conservation structures built under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in northern Karnataka. The planning used the Composite Land and Restoration Assessment Tool (CLART), which recommends appropriate soil and water conservation measures for a particular location. The evaluation was based on primary data collected across 12 treatment and 12 control gram panchayats.

Evaluation findings

There were improvements in outputs such as frontline workers' knowledge and practices with respect to the planning of water conservation structures. The selection of sites for the structures was more in line with CLART recommendations and CLART use was higher in treatment gram panchayats.

However, there were no significant changes in outcomes. The study did not identify perceptible improvements in community participation or draw definitive conclusions about changes in groundwater levels.

Read More | *MGNREGA Planning in Karnataka: Assessment of Digital Tools and Capacity-Building for Natural Resources Management*

1.4 Hydrological assessment of CLART

Partners: Environmental Defense Fund, Foundation for Ecological Security

Building upon the evaluation, we validated the efficacy and accuracy of CLART-based recommendations under different hydrogeological conditions. We conducted a pilot study to test water infiltration in about 30 locations across four hydrogeological conditions and compared them with CLART-suggested areas of high or low recharge.

The primary finding was that soil conditions play an important role in determining the recharge from water-conservation structures, but are inadequately represented in CLART. We shall expand the pilot methodology in the coming year to identify strategies for improving CLART's efficacy.

1.5 MEL Toolbox

Partner: Environmental Defense Fund

The MEL Toolbox is a compendium of tools and methods to democratise impact assessment for watershed management programmes. Robust impact evaluations can enhance water security by providing an accurate and transparent understanding of resource availability. Further, it can ensure that investments are effective and make a tangible difference to communities' lives and livelihoods.

Our analysis revealed gaps in MEL practices—impact reporting often focuses on intermediate outputs rather than outcomes and there is a lack of watershed-scale assessments, among others. To overcome these challenges, we compiled the following tools to guide and simplify the process of sampling, instrumentation, data collection, and analysis.

1. Introduction to the MEL Toolbox | View Toolbox
2. Staff Gauge: A Guide to Measuring Aquifer Recharge through the Water Balance Method | View Toolbox
3. Paired Watershed Studies: Evaluating the Impact of Watershed Management Interventions | View Toolbox
4. Jaltol: A Quasi-Experimental Approach to Evaluating Watershed Interventions | View Toolbox
5. How to Make a Water-Level Sensor at Home: An Easy Tool for Measuring Open Wells and Borewells | View Toolbox

The MEL Toolbox is under continuous development. We shall keep codifying methods and tools to support robust technical evaluations.

1.6 Systematising MEL in Corporate Social Responsibility programmes

Partners: Tata Consumer Products Limited (TCPL), Aga Khan Foundation, Aga Khan Rural Support Programme (India), MS Swaminathan Research Foundation, WASSAN

Creating a MEL Toolbox is only the first step in improving impact assessment practices. We are also ensuring that users adopt and benefit from the toolbox. In this endeavour, we are working with TCPL's implementing partners to:

1. Effectively diagnose water security challenges and create a robust theory of change for their proposed interventions.

2. Design a continuous monitoring plan that systematically measures hydrological data to gauge impact at both the local and watershed scales.

3. Conduct baseline, midline, and endline assessments of their interventions.

This project will conclude in November 2027.

Roundtable on Systematising Monitoring, Evaluation, and Learning in the Water Sector, New Delhi, September 2024

Water Index for Sustainability, Equity, and Resilience (WISER) Roundtable, Bengaluru, March 2025

2 Co-created a draft Water Index for Sustainability, Equity, and Resilience (WISER) framework to assess water security accurately

Partner: Hindustan Unilever Foundation

WISER bridges gaps in water security monitoring by establishing a structured framework for tracking meaningful, outcome-based indicators at the watershed level.

Under the project, we:

1. Conducted stakeholder consultations and a literature review to codify currently used water security indicators into a scientific and scalable framework.

2. Undertook a pilot study to validate these indicators in diverse hydrogeological contexts to ensure their applicability and adaptability across different water-stressed regions in India.

3. Held a roundtable in Bengaluru in March 2025 with 30 stakeholders from academia, donor organisations, and grassroots groups.

The convening shaped the direction of WISER Phase 2 (more details on page 45) and elicited interest from participants in collaborating on fundraising, data collection, and research to effectively assess water security.

Read More | *How Can We Measure Water Security Accurately?*

Phase 1 Results of the WISER Framework

Video | *WISER: A New Science-Backed Index to Transform Water Security in India*

Hindustan Unilever Foundation has partnered with WELL Labs to create a comprehensive and widely applicable water security indicator framework (WISER). They crafted this by leveraging their extensive technical knowledge, conducting thorough research, and holding consultations with subject matter experts. The WISER initiative is aiding us in refining outcome indicators and sharpening methods to assess our programmes' impact on water security.

Ms Nivedita Ghonge
Programme Lead
Hindustan Unilever Foundation

WELL Labs has played a crucial role in supporting continuous monitoring systems for our demand-side interventions (such as direct seeded rice, alternate wetting and drying, and micro-irrigation) as well as supply-side measures (farm ponds, tank desilting, mini-percolation ponds, etc.).

While there were delays in the deployment of devices—such as the staff gauge in the Mannuthu tank—due to the time required to build consensus among farmers, they handled such complexities with patience and professionalism.

Ms Yogalakshmi Rajendran
Associate Scientist
MS Swaminathan Research Foundation

3 Prototyped digital public tools and datasets for water-management interventions

Partners: Indian Institute of Technology Delhi, CommonsTech Foundation for Participatory Technologies (CFPT), Asian Venture Philanthropy Network

Commoning for Resilience and Equity (CoRE Stack) is a set of digital public tools and datasets to accelerate sustainable rural development and promote ecological resilience and social equity. It includes the following:

3.1 Know Your Landscape

Know Your Landscape is a secondary data analysis platform for the sociohydrological diagnosis of water challenges. The CFPT team is beta-testing the tool. We are expanding its capabilities so that it goes beyond raw data exploration to generate actionable insights.

3.2 Commons Connect (CC)

Commons Connect is a participatory-planning app linked to Know Your Landscape data layers and capable of generating Detailed Project Reports (a comprehensive document outlining technical, financial, and design aspects of a proposed project, which serves as a blueprint for the project's implementation).

Over the past year, CFPT user-tested Commons Connect with WELL Labs and grassroots NGOs. This exercise highlighted the need to simplify the Commons Connect user interface and workflow for a better user experience. We are now user-testing the revamped prototype.

Through the above two digital public goods, we seek to ensure that water-management interventions are rooted in a scientifically robust theory of change.

3.3 Jaltol

Jaltol is a web app to assess the impact of interventions with respect to environmental metrics. Over the past year, we developed Jaltol into a tool that allows an intervention village to be compared with a control village to understand the differential impact of an intervention through metrics such as cropping intensity and tree cover.

We learnt that village-level comparisons were insufficient as many NGOs do not saturate entire villages with their interventions. We are now exploring how to highlight site-level changes due to smaller interventions rather than showing village-scale maps wherein changes that occur might be lost.

Learn More | *CoREStack: Accelerating Sustainable Rural Development through Digital Public Goods*

4 Developed a source sustainability strategy for Jal Jeevan Mission

Partners: Public Health Engineering Department, Assam (under Jal Jeevan Mission)

We are creating a roadmap to enhance the resilience and sustainability of water supply systems under the Jal Jeevan Mission in Assam. It explores risks, mitigation approaches, and a cost-effective way to capture hydrological data for a better understanding of groundwater issues.

We have identified three categories of risks associated with groundwater-based water supply projects in Assam:

1. Inadequate water in groundwater sources.

2. Drying of sources due to over-extraction, unplanned urbanisation, climate change, changes in land use, etc.

3. Geogenic and anthropogenic water pollution.

Our roadmap provides risk-specific solutions along with short-term and long-term strategies.

The project will conclude in July 2025.

What We Learnt

1

High-quality evidence regarding what works in water management is often expensive and slow to produce

This hinders government agencies and civil society organisations from adopting evidence-based strategies. Our MEL Toolbox seeks to overcome this challenge by democratising the process of evidence generation with user-friendly, modular tools for impact assessment. The toolbox includes:

1. Playbooks for better on-ground monitoring of interventions.

2. Intuitive web and mobile applications that allow both experts and novices to assess interventions using remote sensing and participatory field data.

2

We must focus on the most common interventions in the sector first, before assessing newer ones

The watershed management sector in India is quite mature and has developed a set of common supply-side and demand-side interventions. However, these interventions may not be applicable in all locations. Scientific assessments for their applicability, site suitability, and impacts have not been adequate. Besides, the quantitative and social benefits of these interventions are often quoted through unrepresentative secondary literature.

What we need instead is in-situ continuous monitoring of a representative sample of these interventions. Thus, to cover the largest ground and ensure the optimal use of limited resources, we should focus on assessing the most common interventions first.

3

Groundwater interventions often fail not because of poor implementation, but because they were misdiagnosed or misaligned with local hydrological and socioeconomic realities

Groundwater-recharge interventions make most sense where the aquifer's water storage volume is greater than natural recharge. There are large swathes in the country where post-monsoon water storage is limited due to shallow aquifers. Since natural recharge quickly fills these aquifers, additional recharge interventions are not needed (as was the case with the groundwater recharge structures we evaluated in Jalna district).

In low-storage areas, demand-side interventions may be more suited than groundwater-recharge interventions.

Similarly, in regions with irrigation from dams and reservoirs, demand-side interventions such as micro-irrigation work better as they may have a larger impact on water savings. Outside canal command areas, supply-side interventions, such as percolation tanks and trench-cum-bunds, are more suitable.

Thus, diagnostics on the problems in a given area and the most appropriate solutions to address them are important to ensure that money is spent in the most efficient way.

4

To achieve impact at scale, organisations must work closely with government stakeholders, who are uniquely positioned to influence systemic changes in the water sector

The government is the largest actor in India's water sector, with unmatched reach, regulatory authority, and access to data. While the Technical Consulting team has focused primarily on issues like recharge and aquifer sustainability, impact at scale requires equal attention to demand-side management, water allocations, and governance—domains where the government is extensively involved.

Our field-based insights and evidence can play a valuable role in improving the design and targeting of government programmes by highlighting ground realities and adaptive strategies. We aim to strengthen our role as a technical advisor to public institutions, ensuring that our scientific and strategic inputs help shape more sustainable and equitable water systems across India.

5

Water security assessment frameworks must be adaptable to different geographies and stakeholders

Water security is a multidimensional issue. Its various aspects—water balance, access, productivity, and resilience—are often in competition with each other, making water management a zero-sum game. Thus, an intervention that benefits one stakeholder could be detrimental to another. For example, conserving water in a lake to support migratory birds could come at the cost of nearby farmers, who need the water to irrigate their fields.

The water sector lacks a coherent framework that provides the language and taxonomy to clearly articulate these dimensions. The Water Index for Sustainability, Equity, and Resilience (WISER) may be able to provide such a framework.

However, the framework needs to be adaptable to different contexts as geographical and social conditions vary widely across India. A potential way to achieve this would be to develop two sets of indicators—core and secondary/optional. This approach ensures flexibility, allowing various users to select relevant indicators based on their needs and contexts.

Currently, the collection of primary data under the WISER framework is expensive and time-intensive. With a modular set of indicators, stakeholders can use a mix of primary data and remote sensing that best suits their budgets and needs. Such flexibility can help reduce costs and increase the framework's uptake across the water sector.

The Way Forward

Along with the projects continuing from last year, we shall work on the following:

1. Expand the MEL Toolbox and promote its adoption

Partners: Environmental Defense Fund and Tata Consumer Products Limited, among others

By working alongside Corporate Social Responsibility programmes and nonprofits, we shall analyse the process of implementing natural resources management projects and understand enablers and constraints at each step. Such a collaboration is an opportunity to go beyond MEL as an ex-post approach and influence planning.

We shall use our MEL Toolbox to:

1. Systematise the proposed intervention into a theory of change.
2. Hypothesise the causal links between activities, outputs, and outcomes.
3. Collect and analyse data to test the hypotheses.
4. Collate learnings and use them to inform future interventions.

We shall also use the learnings from these evaluations to improve CoRE Stack tools and datasets, and provide better, faster, and cheaper knowledge products for the water sector.

2. Implement the WISER framework in Raichur district

Partner: CLARITY

In WISER Phase 2, we shall deploy our water security framework in Raichur district, Karnataka. The framework will be a do-it-yourself toolkit that communities can use to assess their water security and accordingly plan interventions. We shall support them by collecting primary data from a representative sample and secondary data through remote sensing.

We shall also collaborate with state governments to use secondary data and remote sensing for large-scale assessments. It will help address the most urgent water challenges by integrating WISER into state policy planning.

3. Bridge data gaps and promote data sharing to improve evidence-based water management

Partners: National Water Informatics Centre (NWIC), Ministry of Jal Shakti; Arghyam

While government agencies, research groups, and NGOs have a significant amount of data, it is not always available in the public domain. Improved access to water data can help better manage water resources, change individuals' behaviours, and spur innovations.

In this endeavour, we shall enhance NWIC's water data portal by

1. Sourcing water datasets and expanding NWIC's data repository.
2. Fostering data interoperability.
3. Improving the website's user experience.
4. Increasing user engagement and promoting its use in the water sector.
5. Making evapotranspiration data more accurate, granular, and accessible.

To this end, we shall pilot a high-resolution evapotranspiration monitoring system on the lines of the OpenET platform in the US. It will use satellite data and ground-truthing to estimate farm-scale water consumption across different cropping seasons and climatic conditions.

4. Generate evidence to inform the next phase of Atal Bhujal Yojana, India's flagship groundwater governance initiative

Partners: National Project Management Unit, Atal Bhujal Yojana; Arghyam; Tata Trusts; Water for People

Along with generating evidence, we are also using it to shape policies and programmes. In this endeavour, we shall conduct a study to document and analyse learnings from the first phase of the Atal Bhujal Yojana, a World Bank-funded participatory groundwater management programme.

Through journey mapping, institutional analysis, and field-based observations, the study will

1. Compare the programme across four states.
2. Trace how its inputs and activities translated into outputs and outcomes.
3. Uncover best practices and barriers with respect to community participation, groundwater budgeting, and fostering synergies between various government institutions, among other topics.

The study will culminate in the creation of a handbook of best practices to support the design and implementation of Atal Bhujal Yojana Phase 2.

5. Develop a national problem diagnosis tool to bridge the gap between scattered secondary data and actionable local insights

Partners: Environmental Defense Fund, Indian Institute of Technology Delhi

Across India, high-level water-resources assessments exist and local hydrogeological surveys are conducted to inform watershed planning. However, there remains a critical gap in the systematic use of secondary data to generate actionable insights at the micro-watershed level.

WELL Labs is addressing this gap through the development of a problem-diagnosis tool that meaningfully integrates key datasets—ranging from water balance and access to productivity and resilience—to identify the most pressing challenges in each region. This diagnostic tool will not only pinpoint issues, but also suggest context-appropriate solutions, helping local organisations and communities deploy more effective interventions. By combining national coverage with local relevance, it aims to serve as a first-cut planning tool that enhances the design of water-management interventions across diverse geographies.

Platforms and Partnerships

The Green Rural Economy (GRE) platform is the centrepiece of the Platforms and Partnerships programme. It connects changemakers with service providers to accelerate the discovery and implementation of sustainable solutions.

Year in Review

1
Fostered 80 Collaborations for Sustainable Solutions

2
The Green Rural Economy Website Went Live

3
Published 40 Playbooks to Promote Cross-Learning

4
Organised 25 'Clinics' to Address Queries and Troubleshoot Challenges of Social-Sector Organisations

5
Built Directories of Solutions and Services

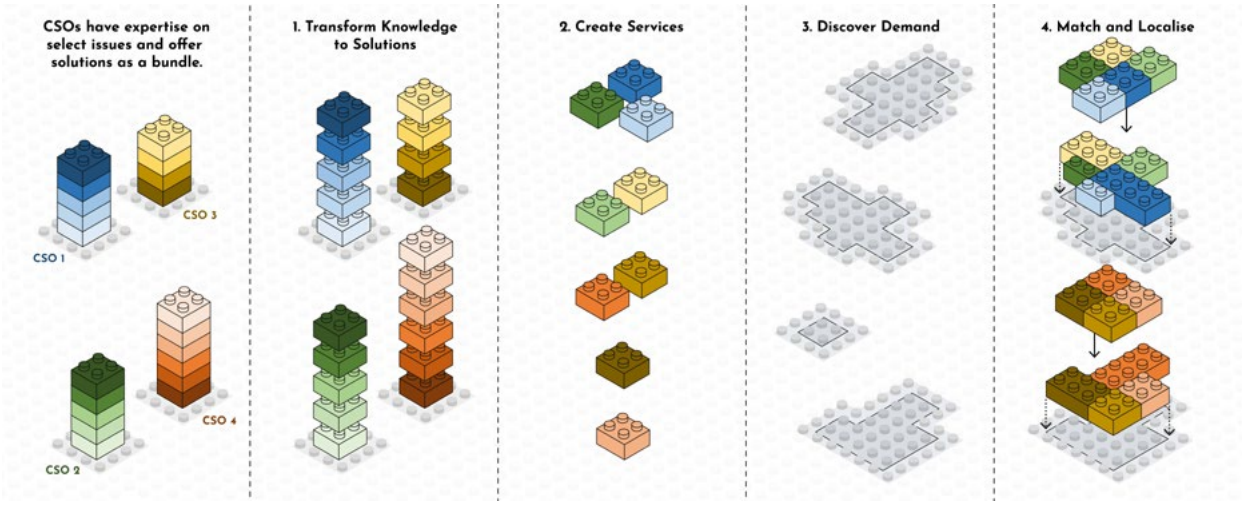
6
Integrated the Sandbox Concept with Green Rural Economy

1 Fostered 80 Collaborations for Sustainable Solutions

Partners: Rainmatter Foundation, WASSAN, SOPPECOM, Himalay Unnati Mission, Aarogya Naturopathy Village, Saahas, and SOUL, among others

We facilitated 80 matches between organisations working on various themes, such as agriculture, waste management, and livelihoods. This helped them find and implement tried and tested solutions, build partnerships to achieve shared goals, and scale their work to new locations.

Read More | *Success Stories from the GRE Initiative*



Grassroots organisations offer deeply contextual, end-to-end solutions. However, a one-size-fits-all approach doesn't work for a country as diverse as India. GRE codifies the knowledge and experience embedded in these organisations as structured, modular, user-centric solutions, which can then be adopted in new geographies and communities.

Gram Swabhimaan, an initiative under the Odisha Sandbox (details on page 56), Rajkanika, Kendrapara, Odisha. Photo by the Socratus team

The GRE platform helped us connect with organisations to further our vision of building circular rural economies. Our knowledge-exchange session with Tarun Bharat Sangh, an NGO that works primarily in Rajasthan and Haryana, eventually developed into a partnership. We organised a three-day workshop in the Mewat region, providing aspiring rural entrepreneurs with the tools and guidance to develop comprehensive business plans.

We recommend the GRE platform to those in the social sector who want to access knowledge and solutions, and collaborate with like-minded organisations.

Mr Sachin Gore
Programme Manager
Lipok Social Foundation, Maharashtra

2 The GRE Website Went Live

We rolled out the website in March 2025 to serve as a repository for our playbooks and directories.

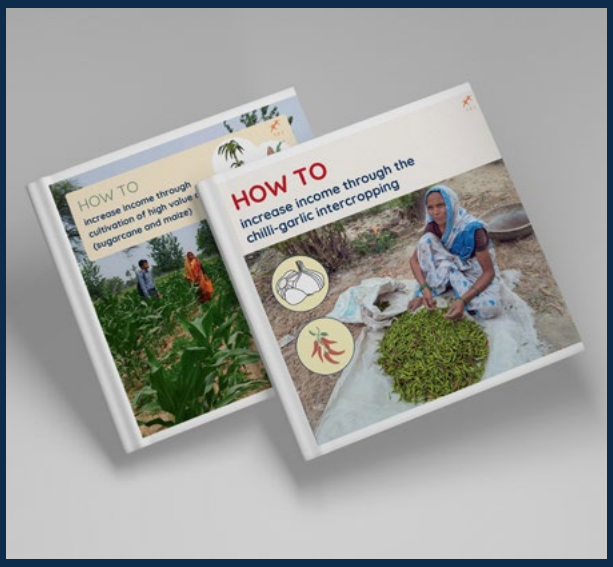
3 Published 40 Playbooks to Promote Cross-Learning

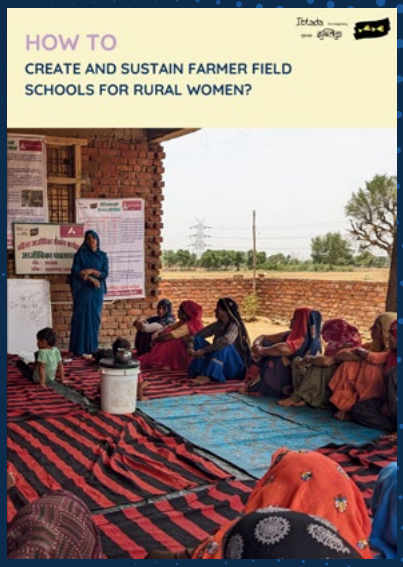
Partners: Axis Bank Foundation, Ibtada, Trust Community Livelihoods, Development Support Centre, Industree Foundation, Bindi International

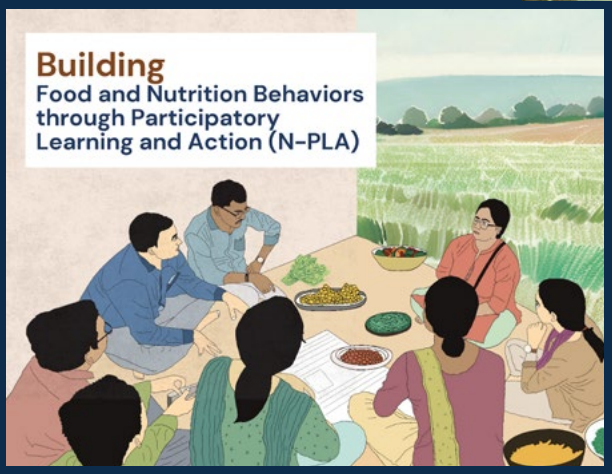
Our playbooks are guides for rural communities to learn and implement solutions. Over the past year, we created 40 playbooks covering topics such as agriculture, animal rearing, water management, livelihoods, waste management, and entrepreneurship. This included collaborations with Axis Bank Foundation's grantees to document and disseminate their institutional knowledge and experiences as playbooks.

Read More | *GRE: Decoding Knowledge and Encoding it in Solutions*

From Pilots to Scale: We Are Documenting Knowledge to Scale Effective Rural Solutions







We attended two Clinics, one on goat rearing and another on sustainable practices for smallholder farmers. Our community workers also downloaded the GRE playbooks. While trainers regularly visit us to hold workshops, in their absence, our staff could still access specialised knowledge on goat rearing through the playbooks. They found the pictorial advice in Hindi easy to understand. We look forward to attending more Clinics and collaborating with the GRE team.

Mr Vikram Paswan
Manager - Resource Mobilisation
Shakti Organisation, Odisha

4 Organised 25 'Clinics' to Address Queries and Troubleshoot Challenges of Social-Sector Organisations

Partners: Akshayakalpa, Lipok Social Foundation, National Coalition for Natural Farming, PRADAN, Tarun Bharat Sangh, Tieedi, Vaagdhara, and Sahas Waste Warriors, among others

We received requests for support from various organisations, which we addressed through 25 'Clinics'. These are virtual or in-person sessions to connect two groups: those seeking solutions for specific problems in the context of rural livelihoods and experts who have successfully implemented similar solutions.

The Clinics led to training sessions, consultations, and long-term support. In many cases, participating organisations signed Memoranda of Understanding (MoUs) to collaborate on initiatives.

Read More | *From Doubts to Direction: How 'Clinics' for the Social Sector Can Spark Action and Collaboration*

5 Built Directories of Solutions and Services

Partners: EcoRestoration Alliance, and ClimateRISE Alliance, among others

The GRE platform hosts a directory of services and solutions. Over the past year, we enhanced the directory with over 125 documented solutions in the domains of water resources, ecosystem conservation, and agroecology.

Read More | *The GRE Initiative: 'Servicifying' the Social Sector*

6 Integrated the Sandbox Concept with GRE

Partners: Socratus, Nature's Club, and Livelihood Alternatives, among others

A sandbox is a space allowing for the testing of new ideas, approaches, and technologies in a real-world setting within the controlled parameters of a particular geography. The Odisha Sandbox helped surface over 100 requests for solutions, which we matched with appropriate solution-providers. It also used tools built by Socratus to:

a. Bring together communities, grassroots organisations, and the local administration to build sustainable livelihoods.

b. Further climate mitigation and adaptation strategies that incorporate community perspectives and local knowledge.

Read More | *The Odisha Sandbox: Advancing the Green Rural Economy Through a Place-Based Approach*

How Can Social-Sector Organisations Find Effective Solutions

What We Learnt

1

Community-based programmes are a key ingredient in the success of sustainable livelihood solutions

Take the case of the animal-rearing programme spearheaded by our partner, Trust Community Livelihoods, in the Barabanki and Bahraich districts of Uttar Pradesh. To reduce goat mortality, the organisation found it necessary to establish an active volunteer network that could facilitate field activities. The selection of volunteers and their capacity-building were critical to fostering community ownership, which in turn, ensured the programme's success.

Our other collaborations also reinforced the need for community-based groups, institutions, and programme designs tailored to the geography, culture, and aspirations of the communities involved.

2

A tried and tested solution must be contextualised before it can be documented as a playbook or shared with other organisations

For a playbook to be useful, we must first answer the following questions:

1. What problem is the solution addressing?
2. How does it make things easier?
3. Whom will a particular solution assist? In what ways?
4. What criteria must a user fulfil to implement the solution?

Answering these questions can help us refine a solution that has been successful in a particular region and scale it to other contexts and geographies. In certain cases, this exercise can help us realise that creating a playbook might not be the best way forward. In such instances, we facilitate Clinics or other forms of collaboration. This was the case when we received requests for guidance regarding backyard poultry from Ibtada and Trust Community Livelihoods.

3

User testing is important for playbooks, especially since different grassroots users have varying styles of accessing information

User testing provided valuable feedback regarding the language, colour schemes, layouts, and characters in the playbooks. Many users demonstrated a keen eye for detail. Even those who were not accustomed to reading regularly could comprehend the information conveyed through visuals.

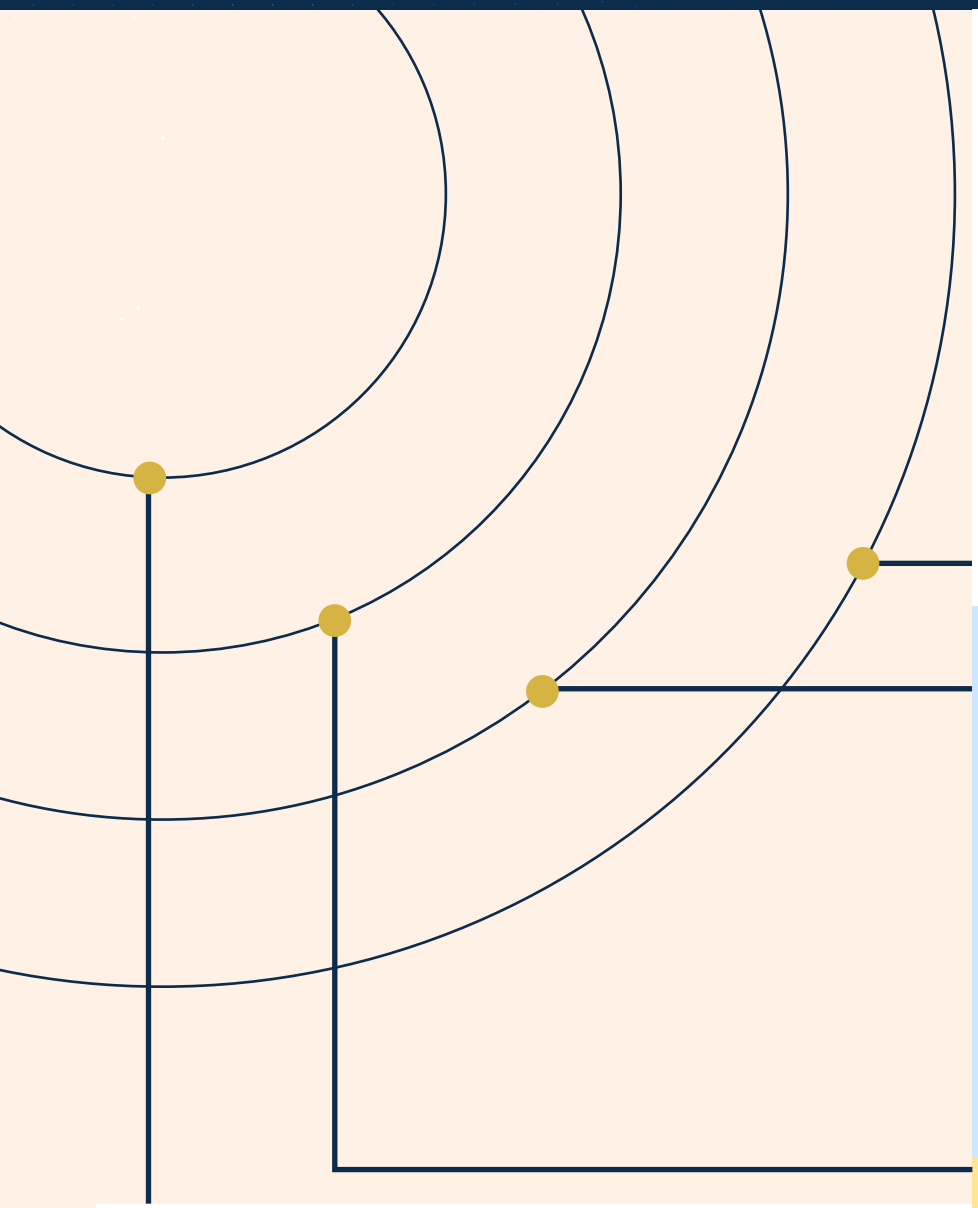
We were trying to create awareness around waste segregation in rural areas. However, instead of reinventing the wheel, we sought out organisations who were already experts in this domain.

We got in touch with the GRE team regarding this, following which they arranged a Clinic with the Solid Waste Management Roundtable (SWMRT). SWMRT did a superb job of understanding the ground realities in rural Karnataka and combined it with their expertise in solid waste management. They took feedback from our team and customised their programme to make it suitable for our context. We are very happy with this partnership.

Ms Uthara Narayanan
Co-founder
Buzz Women, Karnataka

The Way Forward

In 2025-2026, we shall take up the following initiatives while continuing our work on playbooks, Clinics, directories, the Odisha Sandbox, and the GRE website.



1. Build the Raichur Bioregional Hub

With the learnings from the Odisha Sandbox, we shall work with WELL Labs' Rural Futures programme to roll out the hub. It will follow a place-based approach, that is, comprehensively address economic and environmental challenges in the district rather than focus on one issue, such as livelihoods or food security.

2. Enable Other Organisations to Set Up Hubs and Accelerate Collaboration for Rural Development

To scale the place-based approach, we shall codify its architecture and workflows, and share these with interested organisations. Our Clinics and directories will be entry points to establishing hubs.

3. Facilitate Market Access for Farmer Producer Organisations

We shall work with retail and B2B platforms to map the entire value chain of agricultural produce. This exercise will help farmer producer organisations develop in-demand products, get the right value for them, and avoid wastage.

4. Use Digital and Outreach Tools to Increase Access and Discoverability

To facilitate requests for solutions and match service providers with those in need of a particular solution, we shall deploy:

1. Online radio services
2. WhatsApp groups
3. Vernacular Facebook groups
4. Gram Vaani
5. Participatory media platforms created by the organisation

To make our directory of solutions and services more accessible, we shall use chatbots and the United Krishi Interface, a community-led local open agriculture network enabling access to agri-inputs, services, and advisory.

Futures Research

The Futures Research programme works in 'Transformation Labs' (T-Labs).

These are collaborative spaces where communities co-develop and test sustainable, equitable solutions. The goal is to create future-proof solutions for a world grappling with climate change.

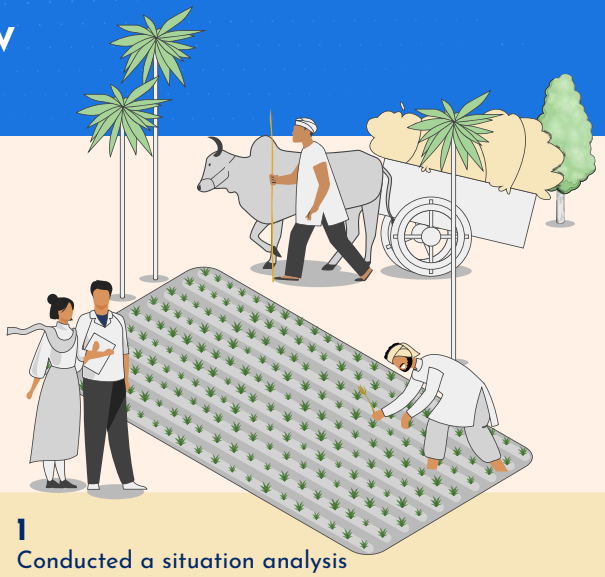
The Futures Research programme hosts the Climate Adaptation and Resilience in Tropical Drylands (CLARITY) project, part of a global consortium to build climate resilience in the tropical drylands of Africa and India.

Under CLARITY, we have established Transformation Labs in Chikkaballapur and Raichur districts, which are semi-arid regions in the south Indian state of Karnataka. In India, the project began in October 2024 and will conclude in October 2026.

As we build the Transformation Labs, we are also shaping the Futures Research programme to foster solutions not just for current challenges, but also future ones. This process takes into account changes in climate and land use along with people's aspirations for themselves, their communities, and their landscapes.

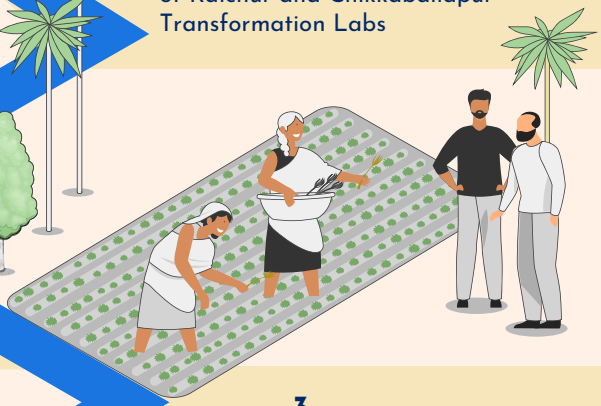
Our methods include identifying trends and signals, participatory modelling, simulations, scenario building, and generating 'pathways', that is, dynamic sequences of decisions and actions designed to move towards a desired future.

Year in Review

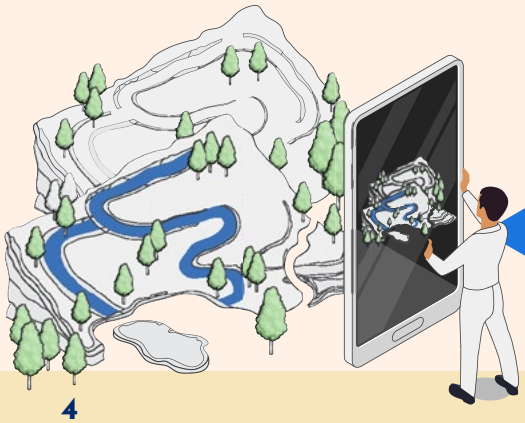


1
Conducted a situation analysis of Raichur and Chikkaballapur Transformation Labs

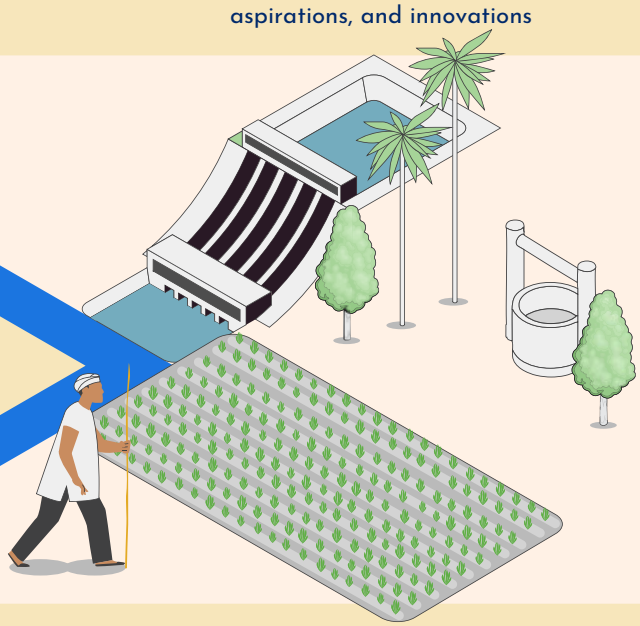
2
Conducted a community hydrology programme to boost technical capacity at the grassroots and thereby improve water management in water user cooperative societies



3
Conducted a qualitative study to understand communities' problems, aspirations, and innovations



4
Launched a video creator programme in Raichur to enable communities to document their aspirations and desired pathways of change



5
Researched the dynamic interactions between communities and water resources to develop strategies for long-term water resilience

6
Built partnerships across the board to co-create knowledge and solutions for land and water challenges

1 Conducted a situation analysis of Raichur and Chikkaballapur Transformation Labs

We collated primary and secondary data to provide a baseline characterisation of the challenges and opportunities with respect to environmental and economic resilience in these regions.

Read More | *Situation Analysis: Raichur Transformation Lab*

Situation Analysis: Chikkaballapur Transformation Lab

2 Conducted a community hydrology programme to boost technical capacity at the grassroots and thereby improve water management in water user cooperative societies

Over the past year, we conducted two of four community hydrology workshops in the Raichur Transformation Lab. Participants received theoretical and practical instruction on:

a. Rainfall and groundwater level measurement
b. Streamflow measurement using V-notch, especially in canals
c. Creating water balances
d. Crop planning

The community hydrology programme concludes in September 2025.

Read More | *Bridging Knowledge and Action: The Community Hydrology Approach*

3 Conducted a qualitative study to understand communities' problems, aspirations, and innovations

We conducted 24 interviews with farmers, civil society organisations' members, and representatives of women's self-help groups. Over the next year, we shall analyse the data and publish a qualitative study.

4 Launched a video creator programme in Raichur to enable communities to document their aspirations and desired pathways of change

Under the programme, we are training eight people to use video and audio tools to share stories for farmers and those in allied occupations. We are providing prompts to help them shape their narratives (for example, what influence does water availability have on their daily activities?). The goal is to equip them to launch and run their video channels so that they can share perspectives from the grassroots.

5 Researched the dynamic interactions between communities and water resources to develop strategies for long-term water resilience

To this end, we are studying groundwater and surface water systems, and analysing climate and land use land cover data. We have:

a. Mapped surface water flow paths, including canals, which were previously not digitised.
b. Compiled data layers for use in hydrological and systems modelling.
c. Finalised boundary conditions for the hydrological and climatic modelling of both Transformation Labs.

In the Raichur Transformation Lab, we have:

a. Identified the boundary for the monitoring of groundwater and surface water.
b. Identified 191 wells for monitoring.
c. Installed four loggers in open and bore wells in the command area of Distributary 10 (~50 sq. km), part of the larger Raichur Transformation Lab (~5,500 sq. km).
d. In Distributary 10, community hydrologists are manually monitoring canals and natural streams.

The data from these will feed into our hydroclimatic models. These are complicated to develop due to the presence of a canal system and river basin in the region.

In the Chikkaballapur Transformation Lab, we are:

a. Identifying which borewells (in both urban and rural areas) are abandoned and which ones are working, and monitoring them.
b. Conducting a vulnerability assessment of domestic water supply access in Chintamani town.

6 Built partnerships across the board to co-create knowledge and solutions for land and water challenges

We mapped key stakeholders, such as government bodies, academics, and civil society organisations, and forged partnerships with them. Our partners include:

a. Prarambha and University of Agricultural Sciences in Raichur.
b. Janapara Foundation, TIDE, BORDA, and Friends of Lakes in Chikkaballapur.

To integrate insights from the Transformation Labs into climate, water, and development policies and programmes, we have partnered with the Advanced Centre for Integrated Water Resources Management (ACIWRM), a think tank of the Water Resources Department, Government of Karnataka.

WELL Labs is doing fantastic work. It is inspiring for researchers like me to collaborate with people who work closely with stakeholders and communities. I am delighted to work with a team that is supportive, so effective on the field, and grounds its interventions in science. They use the research we are doing to deliver impact. As a researcher, I could not ask for more.

Dr Richard Taylor
Professor
University College London

What We Learnt

1

Navigating futures research terminology—visioning, scenarios, interventions, pathways, etc.—requires conceptual clarity, but also the openness to accept plural definitions

As we work with different teams in WELL Labs and external stakeholders, there have been discussions about CLARITY-specific jargon. These opened the door to fundamental questions about the project:

a. If the Transformation Labs are a collaborative endeavour of the community, researchers, and practitioners, who takes ownership of outputs and comes?
b. Who facilitates activities?
c. How should different stakeholders collaborate?
d. How do we foster coherence among contradictory visions and goals?

This spurred us to develop a common understanding of project-related jargon and goals. However, in the collaborative spirit of the project, we must also remain open to nuancing this shared understanding with diverse perspectives.

2

Farming communities excel at learning and applying complex scientific concepts, such as evapotranspiration, soil moisture, and flow control—provided the learning is grounded in their lived experiences

The participants in the community hydrology programme preferred relatable narratives over technical details. They were less interested in theoretical topics (for example, rock types and geological eras) and more focused on actionable knowledge: how to manage water effectively, improve crop yields, and adapt to climate variability. Thus, aligning the community hydrology workshops with immediate local concerns like canal water reliability and land degradation made the pedagogy more engaging.

Field and demonstration-based learning formats were also effective in helping participants understand water management concepts. For example, a physical 3D aquifer model we built was useful to:

a. Communicate the concepts of confined and unconfined aquifers.
b. Link these concepts to the depths of dug wells and borewells.
c. Discuss subjects like infiltration, recharge, and the sustainable use of groundwater.

3

Working on sociohydrological systems can be complicated as environmental and social considerations might not neatly overlap. Transdisciplinary approaches can help overcome this challenge

Natural boundaries such as the ridge line of a catchment area do not necessarily coincide with the political boundaries of a village or district. Thus, finalising the boundary conditions and boundaries of the Transformation Labs required several rounds of consultations between hydrologists, engineers, social scientists, and development practitioners.

In the case of Raichur, some of the considerations that helped define the boundary were:

a. The pros and cons of focusing on the command area of Narayanpur Right Bank Canal vis-a-vis the surrounding regions that do not receive canal water.

b. Unequal water availability for farmers in the head-end and tail-end areas of the canal.

c. Topography of the upper Krishna basin.

Thus, multidisciplinary approaches helped ensure that the Transformation Lab is representative of the region it is situated in.

4

Futures research requires a fine balance between aspirations, imagination, and science

While desired future scenarios must be grounded in communities' needs and aspirations, we must also be able to collectively imagine a range of possibilities beyond them. This imaginative exercise becomes particularly important when working towards systematic transformations over long timespans, such as 2–3 decades. However, most civil society and government interventions have a shorter horizon, such as 3, 5, or 10 years.

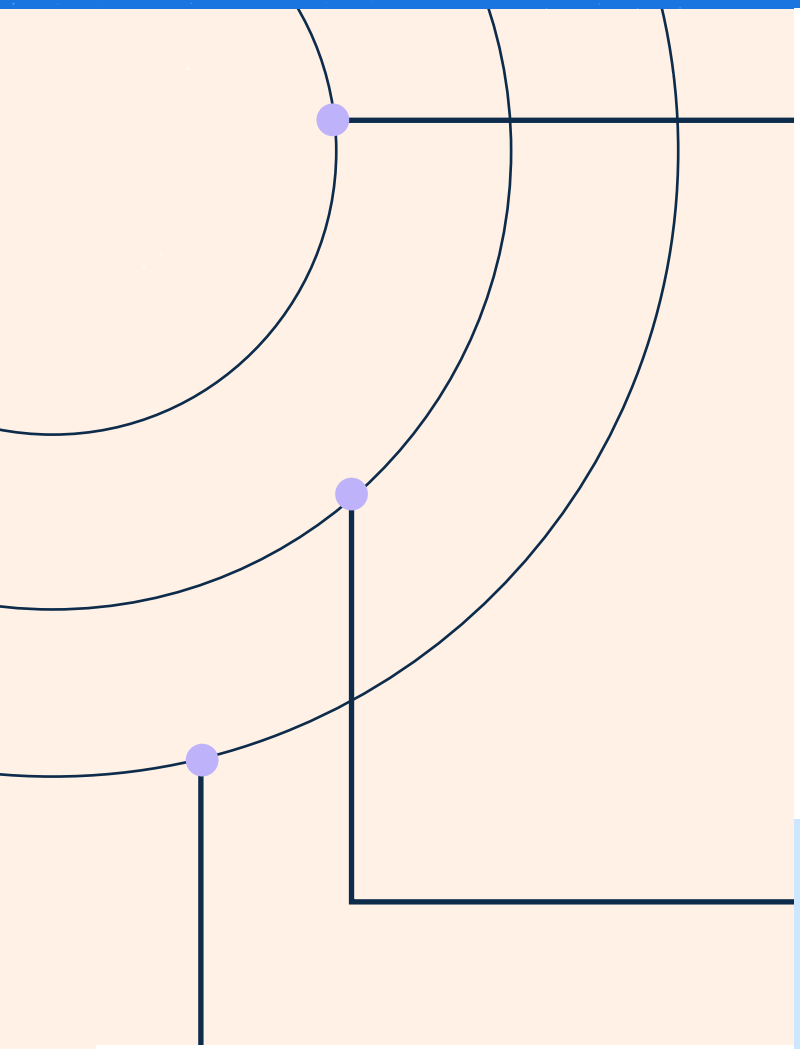
Asking "What kind of future is possible?" requires us to look beyond immediate problems, while still solving for them in the short term. We need to cultivate imagination that is not constrained by the present and an openness to plural perspectives to conjure a range of possible futures. Thus, the research design for future pathways needs to be methodologically robust as well as creative and fluid to account for future unknowns.

I really like WELL Labs staff's diversity and the enthusiasm they bring to their work. There are many young people in the team, who bring dynamism and new ideas. They are also keen to learn—we have learnt a lot from our conversations with each other. From the newest team member to the oldest, everyone freely contributes ideas. I enjoy working with WELL Labs and would like to work with them a lot more in the future.

Dr Alan MacDonald
Head of Groundwater
British Geological Survey

The Way Forward

Over the next year, we shall conclude the community hydrology training and video diary programmes, and continue our research studies and partnerships. Our other priorities are:



1. Conduct workshops to imagine and articulate future scenarios for the Transformation Labs

We shall organise focus group discussions and simulation games with the nonprofit Fields of View to understand communities' adaptive capacities and the thresholds (critical points or limits beyond which a system undergoes significant changes or collapses) of their water and agricultural systems.

These insights will be useful in imagining and articulating long-term possibilities and the pathways we can take to achieve them. By the end of this exercise, we shall generate a set of pathways for the development of water resources in both the Transformation Labs.

2. Set up hydrological and systems models for each Transformation Lab to simulate future development scenarios and their impact on water resources

For systems modelling, we are using tools like STELLA to simulate the behaviour of individuals and institutions in response to changing circumstances. For example, how does improved market access or better prices influence farmers' crop choices?

In parallel, we are creating hydrological models (using tools such as DRYP) to understand the impact of changes in climate, infrastructure, and the actions of individuals and institutions on surface and groundwater resources. We shall integrate insights from the two models to gain a comprehensive picture of future scenarios spanning the social and hydrological aspects of the Transformation Labs.

3. Promote cross-learning between Transformation Labs in Nigeria, Niger, Tanzania, and India

CLARITY's second annual meeting—scheduled for June 2025 in India—will bring together team members from various Transformation Labs. We shall discuss water management pathways, how to incorporate gender equity and social inclusion strategies into our programmes, and the insights from different geographies. All the Transformation Labs will use this cross-learning to refine their work plans for 2025–26. Eventually, we shall co-produce knowledge products, tools, and academic publications under the project.

4. Develop gender-sensitive and socially inclusive pathways for the Transformation Labs

We are collaborating with the Institute for What Works to Advance Gender Equality (IWWAGE) to identify and develop equitable frameworks for our interventions. Such frameworks will help identify the differentiated impacts of climate and development challenges on various groups.

5. Develop and document two futures research methodologies

We shall expand the scope of the Futures Research programme beyond the CLARITY project to develop and document two futures research methodologies:

a. Participatory future envisioning.
b. Appraisal of different pathways using tools like STELLA and multi-criteria analysis.

We shall use insights from these to build a curriculum on futures research for PhD and Master's students.

We shall also explore research methodologies around modelling (hydrological, climate, crop, etc.), data analysis, scenario-building, and co-creating pathways, and incorporate them in other WELL Labs initiatives.

6. Partner with academic institutions to match student researchers with the urgent research needs of grassroots organisations

We shall mentor Master's students from Wageningen University and the School of Public Policy, Indian Institute of Technology (IIT) Delhi, and work with them on research projects. The collaborations include guiding a student from IIT Kanpur in downscaling climate forecasts in Odisha and students from Wageningen University in their analysis of critical moments of climate stress in Raichur and Chintamani.

Through this initiative, we seek to equip student researchers with robust data collection and analysis skills to bridge the knowledge gaps that grassroots organisations and communities grapple with, and provide evidence-based recommendations.

We have learnt a lot from our collaboration with WELL Labs, especially with respect to CLARITY's climate adaptation and resilience framework. We are exploring avenues to bring the WELL Labs team to Niger and train our staff in engaging communities for natural resources management in the arid Niger Valley. We look forward to their support for our groundwater development initiatives and our work with governments and other stakeholders.

Dr Yahaya Nazoumou
Professor
University of Maiduguri

I have tremendous respect for Dr Veena Srinivasan (Executive Director, WELL Labs) and had been hoping to work with her for more than a decade. The CLARE project gave us the opportunity to collaborate on intensive transdisciplinary research around water futures in tropical drylands.

We are working with scientists, modellers, and stakeholders from governments, civil society, and the private sector in India and East and West Africa.

It has been going incredibly well because of the leadership WELL Labs has displayed and the innovative approaches and insights they have brought to the project. Working with them has been a pleasure and a wonderful learning experience. Long may it continue!

Dr John Thompson
Senior Research Fellow
Institute of Development Studies

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CLARE CLIMATE ADAPTATION & RESILIENCE

UK International Development Partnership | Progress | Prosperity

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Bangalore Water Supply and Sewerage Board
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Advanced Centre for Integrated Water Resources Management

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mssrf

BORDA SOUTH ASIA

SOIL

Ibtada the beginning

TRUST Community Livelihoods

dsc Development Support Centre

WASSAN

SOPPECOM

SAAHAS zero waste

era EcoRestoration Alliance

climate RISE alliance

Innovation Guild

Pradan

TIDE

For the complete list of partners, visit our website

Glossary

Agricultural inputs	Agricultural inputs are the products used in farming, such as fertilisers, pesticides, and seeds
Alternate wetting and drying	A rice-cultivation technique where fields are periodically drained and reflooded. It reduces water consumption and greenhouse gas emissions
Bio-resource centres	These are local hubs providing bio-fertilisers, composting solutions, and biological pest control inputs to reduce farmers' dependence on industrially produced fertilisers and pesticides
BBMP	Bruhat Bengaluru Mahanagara Palike (Bengaluru's municipal corporation)
Block	A block is an administrative sub-division of a district comprising many villages
BWSSB	Bangalore Water Supply and Sewerage Board
Command area	The geographical area a dam, reservoir, or canal irrigates
Convergence	In the Indian governance context, convergence refers to building synergy between various government schemes by coordinating efforts across different departments and administrative levels. It seeks to leverage pre-existing initiatives for new goals and optimise resource allocation
CLARE	Climate Adaptation & Resilience programme
CLARITY	Climate Adaptation and Resilience in Tropical Drylands, a project under CLARE
Custom hiring centre	A custom hiring centre (CHC) is a facility that provides agricultural machinery on rent to farmers

Demand-side intervention	In the water sector, demand-side interventions are those that regulate the demand for water rather than boosting its supply (see supply-side intervention below). For example, it could involve providing incentives to farmers to grow less water-intensive crops like millets, rather than, say, water-guzzling crops like paddy
Direct seeded rice	A paddy-cultivation method where seeds are directly sown in the field rather than the traditional method of transplanting seedlings from a nursery into the field. It reduces irrigation and labour requirements and generates less greenhouse gases
Dryland	Drylands are characterised by a scarcity of water. In this report, dryland refers to rainfed fields, that is, those lands that do not receive irrigation from reservoirs and dams through canals
Farmer producer organisations	Farmer producer organisations (FPOs) are legal entities that help farmers sell their produce or buy inputs, among other activities
Futures research	Futures research is the "systematic study of possible, probable and preferable futures. It can be used to help leaders and communities manage uncertainties and increase their resilience and innovation"
Gram panchayat	A gram panchayat is a village or a group of villages
Jal Jeevan Mission	The Government of India's programme launched in 2019 to provide piped drinking water supply to all rural households by 2024
Jeevamrutham	A fermented mixture of cow dung, cow urine, jaggery, flour, soil, etc. that serves as a fertiliser
Journey map	A journey map is a "visualisation of the process that a person or entity goes through in order to accomplish a goal"

Kharif	The agricultural season where crops are planted in June–July and harvested in September–October
Mahatma Gandhi National Rural Employment Guarantee Act	Enacted in 2005, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is the world's largest employment programme. It aims to enhance livelihood security in rural areas by guaranteeing at least 100 days of wage employment in a financial year to every household
Mandi	Agricultural market
National Rural Livelihoods Mission	The National Rural Livelihoods Mission (NRLM), also known as the Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM), is the Government of India's programme to "reduce poverty by enabling poor households to access gainful self-employment and skilled wage employment opportunities"
Panchagavya	A fertiliser made of cow milk, urine, dung, ghee, and curd
Pathway	In the futures research (see above) context, pathways are dynamic sequences of decisions and actions designed to move towards a desired future.
Protective irrigation	Protective irrigation systems are "designed and operated on the principle that the available water in rivers or reservoirs has to be spread thinly over a large area, in an equitable manner. The idea is to reach as many farmers as possible, and to protect them against crop failure and famine, which would regularly occur without irrigation in regions with low and erratic rainfall"
Reinvented Toilets	Reinvented Toilets are "a new generation of toilets that treat waste and kill pathogens without the need for connections to sewers, treatment plants, water supply, or continuous electricity".

Self-help group	A self-help group is a community-based microfinance group, usually comprising women, where members provide financial and other kinds of support to each other to start new businesses or income-generating activities
Supply-side intervention	In the water sector, supply-side interventions are those that increase the availability of water through infrastructure projects, technologies, etc.
Trench-cum-bunds	Trench-cum-bunds are hollowed-out rectangular pits in fields. They are a simple and inexpensive way to 'catch the rainwater'. They also stop and store sub-surface run-off, which helps with replenishing groundwater and improving soil moisture. Digging these pits is a priority under the Mahatma Gandhi National Rural Employment Guarantee Act, boosting both livelihoods and water security
Water user associations	Water user organisations are groups that bring together water users, usually farmers, to manage shared water resources, typically for irrigation
Water user cooperative societies	Another term for water user associations (see above)
Water user groups	Another term for water user associations (see above)
WISER	Water Index for Sustainability, Equity, and Resilience

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