FRANK WATER

Beyond the Boundary

Beyond the Boundary 2023-24:

Final Report

Contents

Acknowledgements

The second year of Beyond the Boundary (BtB 2) was made possible through the amazing efforts of our project partners and their unparalleled expertise.

For the second year in a row, our local partner Myrada demonstrated a deep understanding of local needs, this time in a new location - Sriperumbudur - bringing the “voice on the ground” directly into the project. The Foundation for Ecological Security (FES), with whom we are working for the second consecutive year, similarly engaged on the ground to map out the role that changing institutions play in a rapidly growing peri-urban area.

The Confederation of Indian Industry (CII) Triveni Water Institute joined our project this year, applying their expertise in both watershed modelling and corporate engagement to the project in Sriperumbudur. They have provided a solid, evidence-based foundation for quantifying both the challenges and opportunities in this watershed. Our partner WELL Labs brought their innovative perspective to our project location in Anekal, exploring how nature-based solutions could play a much more significant role in watershed management in India. Thank you to Myrada, FES, CII-TWI and WELL Labs for working with us to make collective action for water a reality

As ever, we owe a huge vote of thanks to Dr. Humanshu Kulkarni whom has provided us with expert advice throughout the project and steered our partner workshops in Chennai.

Finally, we would like to extend our thanks to our funder, Apple, for placing their faith in the project and granting us an environmental partnership for a second year.

Beyond the Boundary team

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Sachin Tiwari
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Hamish Hay
Project Coordinator

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Summary

Beyond the Boundary (BtB) is a multi-year effort to improve watershed stewardship in India's urban peripheries. Through collective action with corporate production sites, civil society, and government, BtB has brought together some of India's most important water resources management stakeholders to positively impact the lives of the poorest. This is the final report for the second phase of the project, BtB 2, which ran from July 2023 to July 2024.

The BtB project, supported by Apple since July 2022, is actively working in watersheds around two target locations in India to generate knowledge and protocols for better water management.

This year in Sriperumbudur (Chennai), BtB has:

1. Convened a cluster of India's most impactful organisations in the water sector to work toward collective action;
2. Created new methodologies for how collective action can be replicated;
3. Catalysed collaboration for data collection and integration between primary and Earth Observation (EO) data sets;
4. Developed new analysis and knowledge of the costs and benefits of NBS for watershed development; and
5. Inspired significant water sector leaders to take the next steps towards collective action.

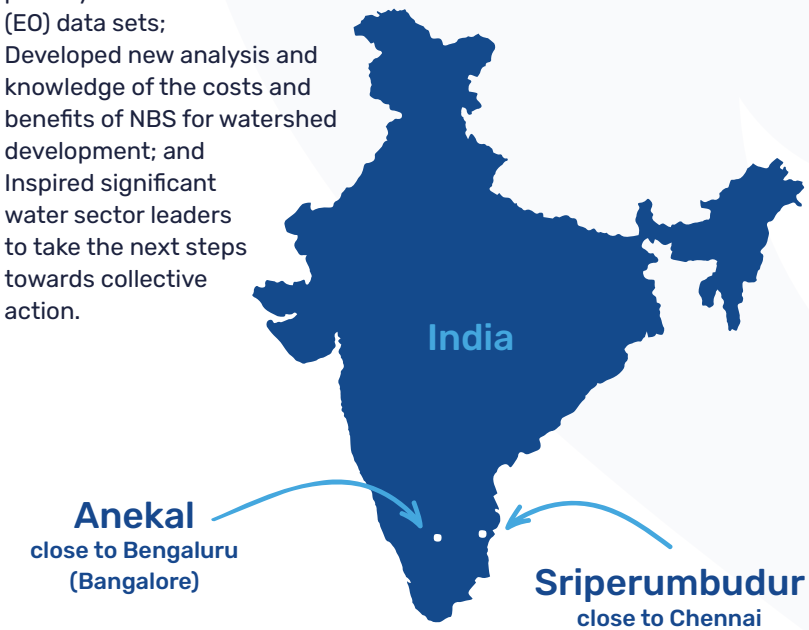

Figure 1: Project locations

Vision and Mission

BtB's vision is: *A world in which water stewardship and collective action lead to sustainable water systems and improved outcomes for communities and the environment.*

BtB's mission is: *To support businesses and value chains in becoming exemplary water stewards within their watersheds. We will achieve this by cultivating knowledge, fostering appreciation, and experimenting with practical solutions that transcend diverse contexts. This will facilitate collaborative efforts among businesses and all stakeholders within watersheds, fostering collective action on a scale that makes a lasting impact.*

BtB has been working in two locations: Anekal, east of Bengaluru (Bangalore), and Sriperumbudur, southwest of Chennai, as shown in Figure 1.

Planned Objectives

The project built on the work of BtB 1 through the following three key project objectives:

Objective 1: Generate the knowledge, appreciation, and practical competence necessary to enable corporate production sites to act as water stewards in the watersheds in which they operate.

Objective 2: Support stakeholders in making use of hydrological models and watershed-level data, including locally held knowledge, to make better decisions around water resource allocations through collective action.

Objective 3: Incentivise fairer water resource allocations and on-the-ground investments to help ensure social equity and opportunities for all, especially the poorest, to access water and improve livelihood outcomes.

Project Team & Partners

The core Frank Water project team consisted of four individuals responsible for the delivery of the outcomes under the Project Management Plan.

1. **Jon Shepherd, Project Manager and Head of Programmes at Frank Water**, was responsible for overall delivery of the project, management of the team, and management of partners;
2. **Sachin Tiwari, Technical & Implementation Manager**, led the technical aspects of the project including data collection, analysis and project logic. Sachin later took on the Partnerships & Data Manager role;
3. **Praveena Sridhar, Partnerships & Data Manager**, was responsible for partnership relations and on-the-ground data collection; and
4. **Hamish Hay, Programme Coordinator**, was responsible for administration, marketing and communications, and the monitoring of project progress against the agreed plan.

The core BtB project team this year also included five highly specialised organisations with many decades of experience working in the water resources space in India. These were:

1. Partner **Myrada** was responsible for on-the-ground data collection. Established in 1968, Myrada focuses on the building of peoples' institutions rather than on the delivery of goods.
2. Partner **Foundation for Ecological Security (FES)** was responsible for mapping water governance systems in Sriperumbudur (Chennai). The organisation was founded in 2001 to reinforce the critical task of ecological restoration in India.
3. Partner **Confederation of Indian Industry – Triveni Water Institute (CII-TWI)** was the primary modelling partner for the project. The institute brings government, industry and civil society together to address water related issues in a holistic manner.
4. Partner **Water, Environment and Livelihoods (WELL)** Labs primarily worked in our first project location, Anekal, to develop the cost-benefit analysis and projectisation framework for nature-based solutions.
5. Hydrological expert Dr Himanshu Kulkarni from **ACWADAM** acted as an expert mentor for all aspects of the project and provided critical inputs for the development of the project logic.

Project Activities

Data Collection in Sriperumbudur

Gathering a detailed picture of lives and livelihoods to water

Survey work

In common with our previous years' work in Anekal, Bengaluru, we engaged Myrada to carry out a bespoke on-the-ground survey to gain granular insights into the water resources situation in the watershed. The task was designed to:

A. Gain a detailed understanding of local contexts, from livelihoods to water resources; and
B. Contribute to the development of CII-TWI's water balance assessment. See page 8.

The household survey consisted of questions around the following themes:

1. Details around interviewees' housing, livelihoods, and occupation;
2. Water sources for drinking and other uses, cost and reliability of access, and quality;
3. Household treatment and water access systems such and rainwater harvesting and boreholes;
4. Agricultural activities such as crops, livestock and irrigation;
5. Water-related health issues; and
6. Participation in water management governance.

The agricultural survey included similar themes, with additional questions around:

1. Type of land holding and useage;
2. Irrigation practices and water sources;
3. Crops, livestock, soil quality, the user of fertiliser, pest control, and conservation activities; and
4. Awareness and participation in farmers' training programmes.

In total, 300 household surveys and 200 agricultural surveys were carried out. Survey villages sampled to provide a broad overview of settlements close to industrial production sites as shown in Figure 2.

The survey was delivered through Frank Water's bespoke WASH Connect app[1] which increases reliability by avoiding errors associated with paper-based systems. Analysis of the data was carried out both by the Frank Water team and Myrada.

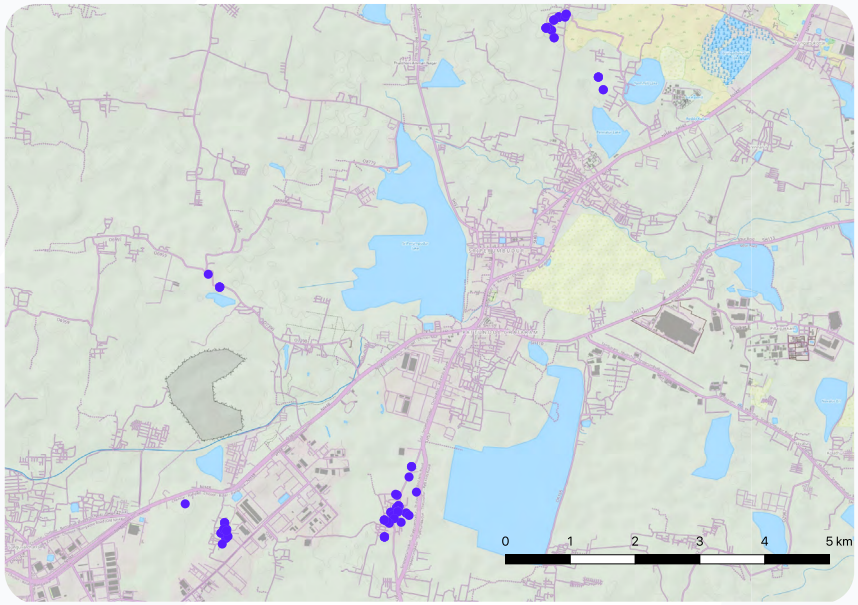

Figure 2: A selection of household survey locations in Sriperumbudur. Each blue dot represents a geolocated survey.

[1] https://www.frankwater.com/projects/wash-connect-using-technology-to-improve-water-security/

Boundary Selection

The project first defined the watersheds and other water boundaries (a "hydrology first" approach) before overlaying administrative boundaries such as taluk, block, and municipal corporation.

Sriperumbudur town was used as a reference point to begin exploring watershed boundaries in the region. The town is a major industrial hub 44 km southeast of the state's capital Chennai, with large industrial clusters and a Special Economic Zone (SEZ) for industrial development, as shown in Figure 3. The SEZ is operated by the State Industries Promotion Corporation of Tamil Nadu (SIPCOT), covers an area of approximately 1800 acres, and hosts industries from the automotive, chemicals, and electronic sectors which produce goods for global markets. Furthermore, it hosts a large, higher population density town undergoing rapid industrialisation - making it an ideal pilot location given the likely future demands on water resources.

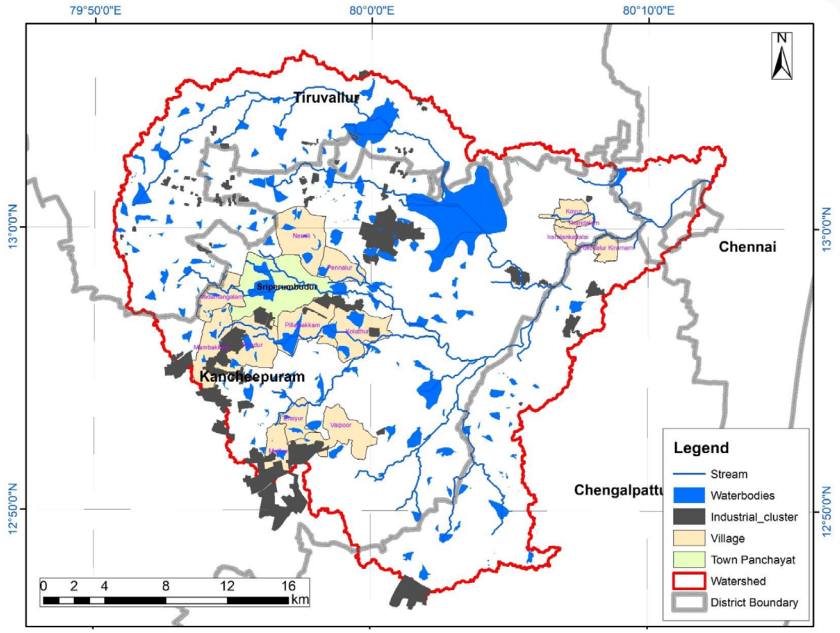

Figure 3: Watershed boundary as defined by CII

After the watershed was identified and delineated, the administrative boundaries that fall within the watershed were overlaid and all the villages and townidentified. Secondary data on topography, drainage, soil types, land use and land cover, climate, and rainfall for the delineated watershed were gathered to develop water availability and demand maps. This informed the drainage lines and drainage patterns concerning the orientation of towns and villages.

From these maps, a set of 12 priority villages[2] were identified. These villages were spread across a selected drainage line and defined as either upstream villages, downstream villages, or villages around Sriperumbudur. From these 12 priority villages, primary data was collected from households and farmers to understand current water allocations.

[2] Priority Villages: Nemili, Pennalur, Kolathur, Pillaipakkam, Pondur, Mambakkam, Vadamangalam, Mathur, Eraiyur, Vaipoor, Kovur, and Polichalur Kiramam.

Initial Findings

Figure 4: Household and agricultural surveys in Sriperumbudur

Overall around 70% of the residents work on daily wages and less than 1% are in farming. 16% of the residents are in salaried jobs in factories in the area. Analysis revealed that most of those working in agriculture in Sriperumbudur cultivate less than five acres of farmland. Out of these, over 44% of the farmers have leased land, and 56.5% work on their own farms. They rely on inefficient flood irrigation techniques and have serious concerns over the quality of irrigation sources. Soil and water conservation activities are rarely practised and pesticides are widely used. There is little awareness of water efficiency programmes.

Occupation	Percentage distribution
Farming	0.3%
Salaried job in a factory	16.0%
Salaried job in a town/city	13.3%
Work on daily wages	70.3%

Figure 5: Occupation profile in surveyed villages

Among the surveyed farmers in nine villages, 55% of the farmers own less than 2.5 acres of land, which categorises them as “marginal” farmers. 30% own land between 2.5 to 5 acres, categorised as “small” farmers. Therefore, over 80% of the farmers in the region comprise small and marginal farmers who can be considered as more vulnerable to fluctuations in water availability and climate change.

Size of farm (acres)	Percentage of farmers in 9 surveyed villages (n=200)
0-2.5	55%
2.6-5.0	30%
5.1-7.5	5%
7.5-10.0	5%
10.1-50	5%

Figure 6: Farm size in surveyed villages

Projectisation of Nature-based Solutions

Informing evidence-based watershed development

WELL Labs were engaged in BtB due to their cutting-edge research on holistic solutions for water scarcity. For BtB 2 they harnessed insights from our micro-watershed model in Anekal to develop a cost-benefit methodology for watershed interventions. Appreciation and application of so-called "nature-based solutions" (NBS) is in its infancy in India but the team assessed that they could play a growing role in water stewardship in Anekal and India more widely. They identified three categories of relevant NBS:

- **Type 1:** the improved use of existing natural ecosystems, such as the restoration of existing structures such as lakes;
- **Type 2:** the improvement of managed ecosystem sustainability or function; and
- **Type 3:** the design and management of new ecosystems.

Figure 7 shows their draft framework for assessing the relative costs and benefits of NBS solutions for a particular location.

They identified the most relevant sources of data for assessing both costs and benefits and links to existing Environmental, Social and Governance frameworks. Following an assessment of the challenges in the Anekal watershed, they recommended the following interventions, as shown in Figure 8.

Nature-based solution type	Water challenges addressed
Waterways (urban/peri-urban)	• Improves water security through groundwater recharge • Reduces property damage through flood water management
Rain Gardens (urban)	• Improving water availability in urban settlements
Bioswales (urban)	• Groundwater recharge • Reducing flooding risk and erosion
Wetlands (built and natural) (peri-urban/urban)	• Improving water availability in urban settlements
Green spaces (bioretention and filtration) (urban)	• Addressing stormwater concerns by reducing volume and run-off rate • Improves water quality by reducing pollutant levels

Figure 8: Proposed nature-based solutions for Anekal

NbS	Costs			Comparative grey infrastructure cost	Benefits			
	CAPEX	OPEX	Transaction Costs		Enviromental	Economic	Social	Governance
Intervention 1					Improve water quality by reducing pollutant levels			
Intervention 2					Improve water quality by reducing pollutant levels			
Intervention 3					Reduction flood risk and erosion			
Intervention 4					Ground water recharge			
Intervention 5					Increased aquifer recharge			

Figure 7: An overarching framework for assessing NBS benefit

Modelling and Water Balance Assessment

Developing a hyper-local watershed model, validated by on-the-ground data

The Confederation of Indian Industry Triveni Water Institute (CII-TWI) a unique institution where government, industry and civil society have partnered to address water related issues in a holistic manner developed a hyper-local watershed model, hosted 10 meetings with a wide range of local and state government departments, and led focus group discussions in 12 strategically selected villages.

The micro-watershed model helps to predict the impact of management decisions on water, sediment, contaminants, and aquifers in the watershed and is crucial for better multi-stakeholder decision-making. The water balance is calculated considering precipitation, soil conditions, shallow aquifers, and deep aquifers and was developed through CII's WATSCAN framework. This comprises an integrated hydrological-hydro chemical-groundwater quality model and a GIS and remote sensing-based integrated decision support system (DSS) framework for water resources evaluation. It includes both a land phase version, simulated within ArcGIS , and helps to calculate land runoff, groundwater aquifer recharge, and contaminant loadings, and an additional groundwater module using MODFLOW and MT3D for groundwater simulation.

Sriperumbudur's hydrological evaluation is based on various physical characteristics of the watershed. Spatial datasets pertain to topography, land use, and soils, processed from various satellites and available secondary databases. Non-spatial datasets include data on the weather (rainfall, temperature, humidity, and wind direction), soils, land use and cover characteristics, water use, and demands. Types of data and the sources are listed in Figure 9.

Type of Map	Source
Administrative Boundary	Tamil Nadu Geographical Information System (TNGIS) Tamil Nadu e-Governanace Agency (TNeGA)
Socio-Economic	Census of India
Village Boundary	Census of India, Survey of India
Landuse	Multiple Sources
Built-up	Sentinel-2 LULC
Industrial	Google and National Atlas and Thematic Mapping Organization (NATMO)
Agriculture	Sentinel-2 LULC, IWMI - GIAM, NATMO
Water Bodies	Sentinel-2 LULC, Google
Rainfall	India Meteorological Department
Temperature	India Meteorological Department
Soil	FAM, NATMO
Topography	SRTM
Slope	DEM

Figure 9: Data Sources

The delineated watershed at Sriperumbudur (Figure 10), part of the Adyar River System, is 768 km² in total and consists of 110 sub-watersheds. In total, the built-up area occupies 34% of the total area, agriculture 25%, and range grasses 24%. Water bodies, including rivers, lakes, and ponds, account for 8% of the watershed area including several large lakes, such as Chembarambakkam. The poor condition of many of these lakes was noted at an early stage in the project. Finally, forest areas comprise 5% of the landscape and industrial areas 4%. Built-up areas are largely skewed towards the east of the watershed, closest to Chennai, whilst agriculture is more concentrated in the west. Industrial areas, on the other hand, are relatively evenly distributed across the watershed.

The area is reliant on rainfall concentrated largely at certain times of the year, and the northeast and southwest monsoons contribute rainfall of 54% and 36% respectively, or 90% of the area's total annual rainfall. Annual rainfall can vary significantly from year to year, from as low as 496 mm to as high as 2397 mm. The soil in the watershed consists largely of loam and clay loam soils, which have a high runoff rate and a very low infiltration potential.

The watershed modelling (Figure 11) has demonstrated significant gaps between water supply and demand across large sections of the watershed, especially to the west in the western areas. This corresponds with the bulk of the agricultural areas of the watershed, as well as areas of industrial development.

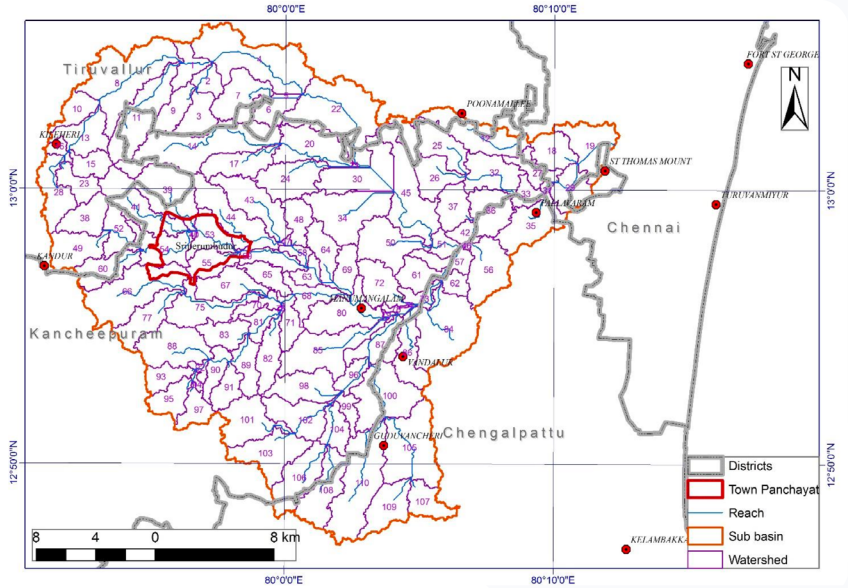

Figure 10: Delineation of the watershed at Sriperumbudur

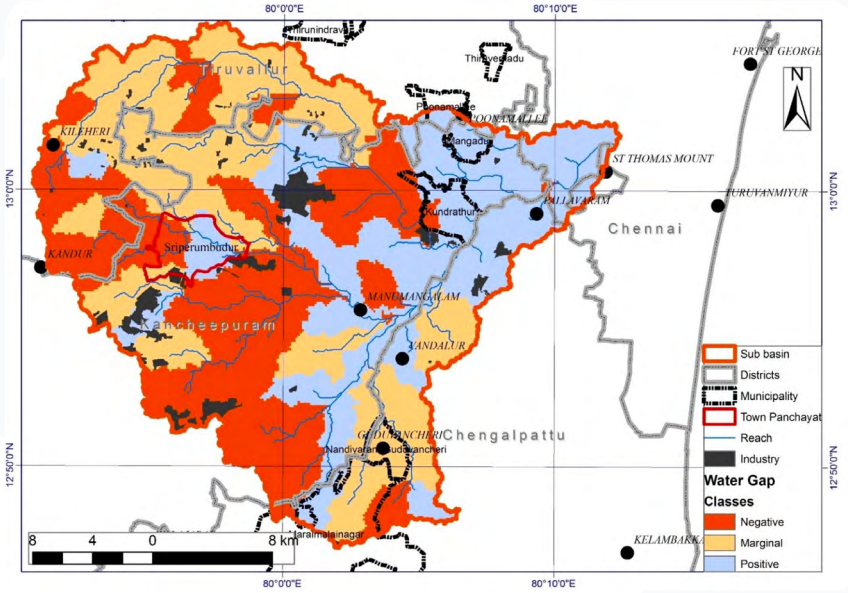

Figure 11: Water Gap Analysis

The Policy and Governance Context

Cracking the policy code needed to achieve collective action

The Foundation for Ecological Security (FES) mapped key institutions in water governance and water-related service provisioning, provided inputs towards a model policy for peri-urban water management, and contributed towards watershed-level water stewardship processes. They had a particular focus on the changes wrought by the rapid industrialisation of the peri-urban area.

Activities in the watershed included:

1. A literature review of the policy context;
2. Interviews and focus group discussions to assess and document the on-ground dynamics of water use and management; and
3. Mapping and analysis of spatial patterns of construction and water resource distribution using remote sessions.

As part of the mapping exercise, they hosted focus group discussions (FGDs), reaching 99 individuals and 18 different locations in total. The individuals who took part in such discussions included farmers, daily wage labourers, local politicians, community elders, and many others. FGDs were hosted both within the target villages and at lakeside locations.

Additional Expert Support

Engineering consultancy Arup has been a long-term technical supporter of Frank Water's work and has been key to Frank's approach to systems change and scaling. For Beyond the Boundary, Arup and Frank Water signed a Technical Service Agreement to provide strategic guidance in the following areas:

1. A study into **Environmental, Social and Governance (ESG) frameworks**[7] and their relation to water resources management, including a comparison between those applicable in Europe and India. The Business Responsibility and Sustainability Report (BRSR) framework is mandatory for the largest companies in India and includes metrics for water consumption and discharge. Nevertheless, the study considers the indicators to be unrobust with many subject to voluntary exclusion. The findings from the report will be vital for supporting large corporations and their productions in engaging collectively in water stewardship.
2. Strategic support for **green infrastructure evaluation**. Arup provided expert advice to WELL Labs to support the cost-benefit analysis of nature-based solutions, especially quantitative elements.
3. Strategic support for the development of a **Water Stewardship Data & Action Portal** (Figure 12). Beyond the Boundary has a staged plan to develop a bespoke digital database for watershed data which supports the demands of multi-stakeholder collective action. Arup guided the structure for such a portal and the relevant technologies.

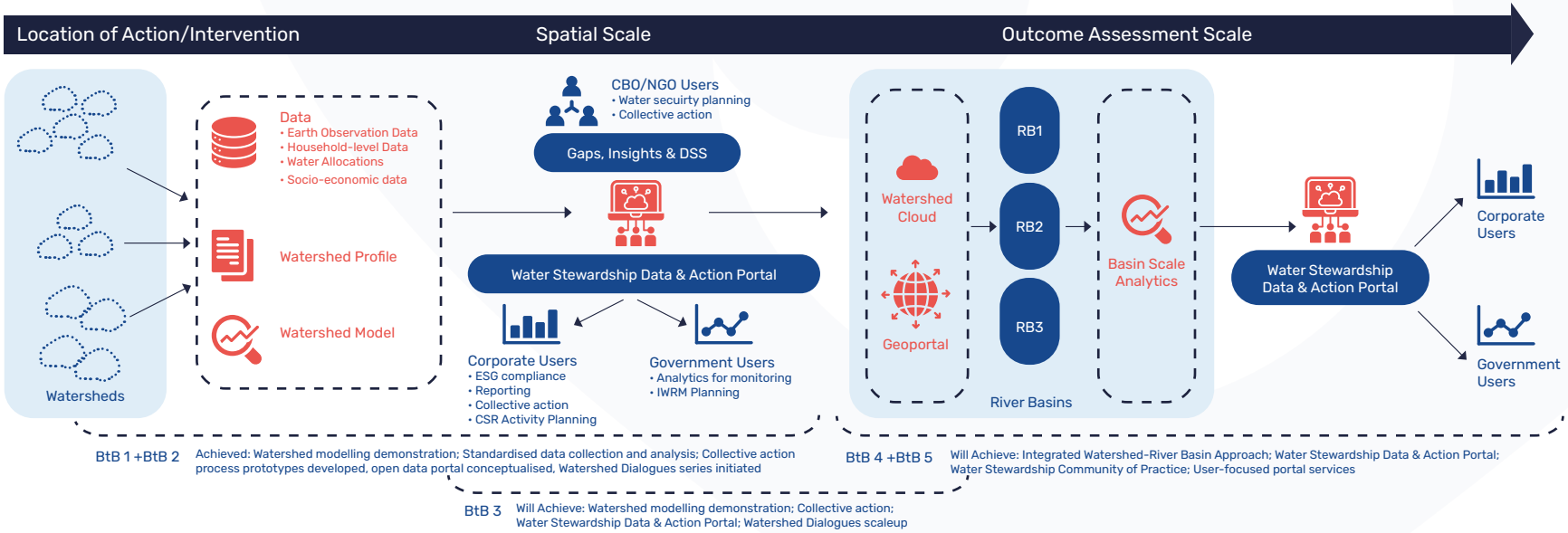

Figure 12: The Water Stewardship Data & Action Portal situated in the Beyond the Boundary project logic

[7] https://www.frankwater.com/app/uploads/2024/07/Beyond-the-Boundary-ESG-Reporting-Frameworks-Relevant-to-WRM-and-Water-Stewardship-Literature-Review-Arup-Rev1-EXTERNAL.pdf

Workshopping the Project

Our workshops were a vital arena for integrating the wealth of knowledge and experience held by our team members and partners

Chennai, March 2024

The BtB 2 Stakeholder Workshop in Chennai on 7 March 2024, focused on sustainable watershed management in Sriperumbudur through collective action. The CII-Triveni Water Institute's analysis revealed diverse land use, with significant built-up and agricultural areas. Discussions highlighted industrial land use impacts, emphasising that industries should not conflict with other vulnerable stakeholders.

Key concerns included the reliability of public data around industrial land use and the importance of water stewardship. Dr. Himanshu Kulkarni (Figure 13) stressed the need for both geological and hydrological data to draw useful conclusions about the state of water resources. Presentations covered governance, cost-benefit analysis for nature-based solutions, wetland restoration, and grassroots water conservation.

Participants debated the risks and efficiency of nature-based solutions, with differing views on their compatibility with traditional sewage treatment. Dr. Kapil Narula from CII emphasised integrating cost-benefit analysis into decision-making. The Foundation for Ecological Security noted the lack of water user associations and the dominance of panchayats in the governance of water resources.

Figure 13: Dr Himanshu Kulkarni at the March Project Workshop

The workshop concluded with discussions on collective action challenges, such as industry water demands and data resolution. The workshop helped partners to align the production of their final outputs for this year of the project.

Figure 14: Discussions during the March 2024 workshop in Chennai

Project Deliverables

Deliverables

Planned deliverables for the second year of the BtB project were managed through an impact matrix, which mapped the Project Deliverables to Project Outcomes and Project Objectives, as shown in Figure 15. Please note that Deliverable 4, a Decision Support System, was removed from the list of deliverables this year.

	Project Deliverables	Outcome (the changes in behaviour, practice, or systematic capacity)	Objectives (the change in state or situation)
D1	A detailed project plan detailing successes and learnings from Beyond the Boundary (BtB) 1 to inform BtB 2.	Improved planning and impact of BtB 2 and future interventions.	01. Generate the knowledge, appreciation, and practical competence necessary to enable corporate production sites to act as water stewards in the watersheds in which they operate.
D2	Three collaborative workshops and short workshop reports.	Improved knowledge sharing and expert inputs to the project's objectives.	
D3	A hydrological model of the selected watershed around the city of Chennai.	Stakeholders (private supply sites, civil society, and local government) can make informed decisions around fair allocations of water resources between household, agricultural, and industrial uses.	02. Support stakeholders in making use of hydrological models and watershed-level data, including locally held knowledge, to make better decisions around water resource allocations through collective action.
D5	A blueprint methodology (physical document or online) comprising a set of protocols and a knowledge base that can be trialled by other stakeholders in diverse locations.	Enable and support industry suppliers to execute the whole stewardship model developed in BtB for their facility and implement watershed-level water stewardship.	03. Incentivise fairer water resource allocations and on-the-ground investments to help ensure social equity and opportunities for all, especially the poorest, to access water to fulfil and improve livelihood outcomes.
D6	Directly engage with businesses and stakeholders through listening circles and Water Stewardship Dialogues.	Improved knowledge, appreciation, and practice amongst businesses for how they can engage in collective action as water stewards. Tools and protocols are harnessed to deliver on-the-ground water interventions.	
D7	Complete on-the-ground water stewardship interventions in Anekal with local partners and perform an impact study.		
D8	Develop a cost-benefit analysis, projectisation framework, and solutions repository for appropriate watershed interventions.		

Figure 15: List of deliverables

Assessing the Project Outcomes

Deliverable 1 - Detailed Project Plan

The first project outcome was the production of the Detailed Project Plan, which set out the project rationale, comprehensive roles and responsibilities in the project, and the mechanisms for achieving impact. It also identified the following opportunities for building on, and improving relative to, the outcomes from year 1, which were successfully integrated into BtB 2:

1. **Integrating datasets from multiple partners:** CII was closely involved in Myrada's data collection process to ensure better compatibility between datasets;
2. **Engaging existing watershed initiatives:** We were invited to join "unpacking collective action", a loose group of large organisations seeking to drive collective action together, and have dramatically increased project visibility;
3. **Reaching out to external stakeholders proactively for mutual benefit:** We are pursuing promising lines of enquiry for increasing the impact of BtB in new locations with large multinational suppliers;
4. **Engaging the public sector:** Local, regional, and national government agencies have been heavily engaged in CII's data collection and modelling exercise; and
5. **Projectisation of outcomes of BtB and actionable solutions for improving watersheds:** WELL Labs has produced recommendations for a promising list of projects in Anekal, based on the work carried out in BtB 1.

The systematic planning of the Detailed Project Plan has helped to achieve improved planning and impact of BtB 2 and future interventions.

[4] For more information about this dataset please visit https://www.chc.ucsb.edu/data/chirps
[5] For more information visit https://lpdaac.usgs.gov/products/mod11c2v006/

Deliverable 2 - Three collaborative workshops

The team hosted an all-partner online workshop in December 2023, and a successful physical workshop in March 2024, as described in the chapter "Workshopping the Project". The final, third, workshop is planned for September 2024, delayed due to the availability of key stakeholders in India.

"Improved knowledge sharing and expert inputs to the project's objectives" was achieved through expert advisor Dr Himanshu Kulkarni providing critical feedback on all the partners' approaches and a presentation of draft analysis which strengthened the project in the following ways:

- WELL Labs were challenged to include more data on sewage treatment practices in the watershed and their compatibility with nature-based solutions. Heavy sewage loadings are a critical challenge in the project area;
- FES were asked to include more information on water bodies in their assessment, especially their governance and management;
- CII were asked to conduct a groundwater balance analysis, as this constitutes most abstractions in the project area;
- CII were challenged to include more geological data for certain land use classifications to gain a more nuanced insight into aquifer performance; and
- More research was commissioned into the policy levers which can be used to manage groundwater abstraction.

Deliverable 3 - Hydrological Analysis

At the time of writing, the team is waiting for the full outcomes of the hydrological analysis, although preliminary mapping has already been used for targeting villages for more detailed survey work. The team will then work to actualise this model for decision-making.

Preliminary outputs for Sriperumbudur's delineated watershed include a:

1. Water Availability Map;
2. Water Demand Map; and
3. Water Availability and Water Demand Gap Assessment.

Based on these outcomes the study centres on three key water demand sectors: Industry, Agriculture, and Built-up areas. It also considers water gap classifications: negative, marginal, and positive (as shown in Figure 16), and the hydrological state of watershed villages. Specific villages in the Sriperumbudur watershed were identified to conduct focused group discussions to add qualitative richness to the study and to verify quantified model outcomes.

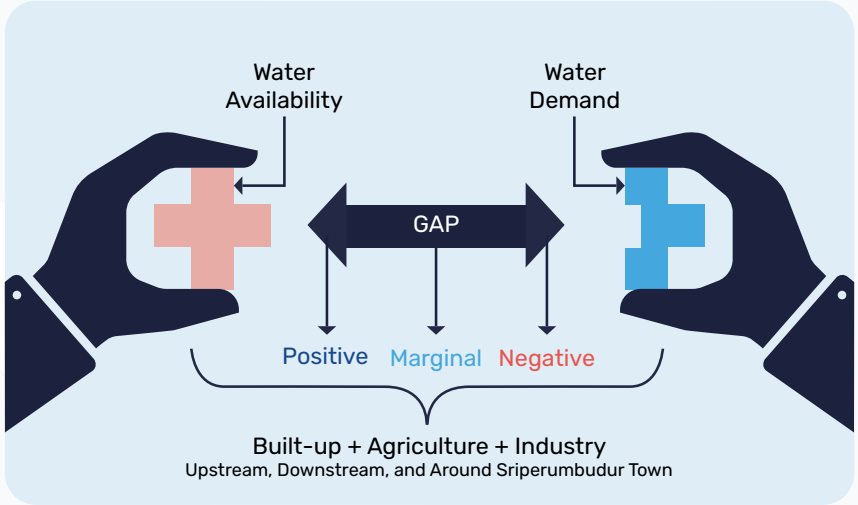

Figure 16: The principles of a gap assessment

Deliverable 5 - Blueprint Methodology

Pulling together the knowledge gained through BtB, a Blueprint Methodology for collective action on water is being created, with the potential for this to be used directly with industry partners at the next stage of the project. The Methodology will "*enable and support industry suppliers to execute the whole stewardship model developed in BtB for their facility and implement watershed level water stewardship*".

The methodology is organised into 6 chapters:

Chapter 1: Rationale
Chapter 2: Principles
Chapter 3: Water-Contexts
Chapter 4: Key Ideas in Collective Action
Chapter 5: Actors and Role
Chapter 6: Implementing Collective Action

The methodology is designed to serve as a comprehensive guide for: government officials in charge of provisioning water through public utilities or water resources planning for industrial zones; agricultural departments involved in decision-making; water managers or site managers; business managers of companies that need to assess and plan for business risks; and civil society organisations. It provides clear, concise, and simplified information to help them effectively integrate their actions within existing management structures, ensuring coordinated and impactful water stewardship efforts. By following the guide, stakeholders can better understand their roles, collaborate with others, and contribute to sustainable water management in the watershed.

Collective action is central to the document as water management in India is highly atomised. Water-related activities and decisions occur at hyper-local levels, such as individual households and farms, and these decisions are influenced by specific local conditions and situations. Therefore, to create effective collective action around water, knowledge-gathering, and action must start at the level where the actual work and needs are present. By addressing water issues at these small, localised scales first, these efforts can then build up and combine into broader collective action.

Deliverable 6 - Listening Circles & Water Stewardship Dialogues

The team has increasingly engaged directly with industry over the past year of the project, particularly through the following events:

- WELL Labs' listening circles and expert interviews;
- The Alliance for Water Stewardship (AWS) Forum in Edinburgh, Scotland, which led to strong engagement with Primark, Coca-Cola, WWF, and others and better alignment with their water stewardship strategies; and
- Attendance at World Water Week August 2024, with engagement with a wide range of industry stakeholders.

Additionally, we have continued engagement with the AWS, which has led to a proposal for a joint continuation project.

The proposed Water Stewardship Dialogues is under development with CII and will include:

1. Two regional events (one in Bengaluru and one in Mumbai) aimed at promoting water neutrality and collective action, with attendees from industry, government, academic, and civil society, co-hosted by CII and Frank Water; and
2. One national event, a Water Innovation Summit, with Frank Water as a primary partner to facilitate strategic discussion around Beyond the Boundary outcomes.

These events will help us to continue to work towards the outcome of "*improved knowledge, appreciation, and practice amongst businesses for how they can engage in collective action as water stewards. Tools and protocols are harnessed to deliver on-the-ground water interventions*".

Deliverable 7 - Ground Interventions

BtB partner Myrada has completed a Cattle Pond and Check Dam rejuvenation project in Bengaluru, to restore the original storage capacity of these structures, which will increase in groundwater table of the surrounding locality of the cattle pond to reduce flooding and restore local biodiversity.

The intervention led to directly measurable benefits, including a significant increase in water surface area, storage depth, storage capacity, and water availability through direct abstraction and groundwater recharge. At the beginning of 2024, Myrada commenced an Impact Study, but due to drought conditions around Bengaluru (which have been widely reported in the national and international media) the project has been extended, and the impact study will take place in November and December 2024 following the monsoon season.

Myrada has a strong track record of robust on-the-ground hydrological analysis and we expect the results to give us valuable insights into the state of water resources in Anekal. We believe that this will "*improve knowledge, appreciation, and practice amongst businesses for how they can engage in collective action as water stewards*".

Figure 17: Myrada carrying out hydrological analysis using a borewell.

Deliverable 8 - Projectisation Framework

WELL Labs' work has successfully resulted in a framework for the cost-benefit analysis of NBS, a high-level proposal for interventions in Anekal based on analysis from Beyond the Boundary 1, and a database of case studies for NBS. This will form part of a suite of "*Tools and protocols are harnessed to deliver on-the-ground water interventions*."

Conclusion

Beyond the Boundary (BtB) creates and provides the enabling infrastructure necessary for engaging collectively in responsible water stewardship. This infrastructure consists of:

1. Hydrological data at the watershed scale;
2. Hydrological models to support future planning;
3. Collective action mechanisms; and
4. Integrations across spatial scales, actions, and actors.

As evident from the BtB process, the approach prioritises taking action on assessed water risks. We see the project evolving into a recognised demonstration of how to address these risks effectively. Currently, there are tools available to diagnose water risks at the river basin scale, such as WRI's Aqueduct, WWF's Water Risk Filter, and water accounting approaches like Volumetric Benefit Accounting (VBW). Additionally, standards like the AWS certify businesses on their water use and efficiency.

However, there is a significant gap in understanding what can be done to address water risks at smaller scales, such as watersheds and micro-watersheds.

BtB has expanded the 'collective action on water' approach from Bengaluru to Chennai and created new mechanisms for on-the-ground watershed development, fairer water allocations, and reduced business risk. Both Chennai and Bengaluru are experiencing rapid industrial growth alongside historic agricultural communities, acting as microcosms for global challenges in water and climate change. Both watersheds face risks to water security, compounded by the abundance of water-intensive cash crop production and the dominance of inefficient irrigation practices such as flood irrigation. These challenges demand collective and collaborative action from all sectors.

There is a real risk that, in times of drought, industrial production sites could contribute to lost agricultural production. A scenario where capital-intensive industrial production competes with the livelihoods of farmers has the potential to put vulnerable livelihoods at risk and potentially halt business operations.

Over the past two years, BtB has significantly contributed to collective water action in India, specifically in water stewardship outside and surrounding global production sites. BtB has:

1. Innovated for micro-watershed modelling of peri-urban, industrial watersheds;
2. Convened collective and collaborative action by leading water sector actors in India;
3. Facilitated knowledge sharing and innovation in India and beyond, creating new blueprints for action on the ground;
4. Advocated at a global scale for increased uptake of collective action tools and methodologies;
5. Engaged global corporations in water stewardship and expanded BtB beyond the initial collaboration; and
6. Primed two globally significant supply chain watersheds for 'fully inclusive collective action.'

Beyond the Boundary is acknowledged for its contribution to the body of knowledge in the water stewardship space, which demands serious attention and will be required to meet the challenges of tomorrow.

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