March 2024

Impact Assessment Study

Rejuvenation work at Nandi Lake and restoration of traditional structures (Kalyani and Gunduthopu) at Sultanpet village, Chikkaballapura district, Karnataka

Study commissioned by United Breweries Limited

Study conducted by Nous Consultants

Acknowledgements

We are very grateful to Srinivas and Lokesh of United Way Bengaluru for the field support at Nandi and for the open exchanges during the course of this assessment.

We are grateful to United Breweries Limited for giving us the opportunity for undertaking this study. Special thanks to Sargam for all the speedy and flawless coordination.

The Nous Team which undertook this study consisted of the following members – Sanjay Prasad (and his team of 5 field investigators), Jayapadma and Neelima Khetan. Expert inputs on Volumetric Water Balance calculations were provided by Dr MVRL Murthy of eKO Knowledge.net.

Nous Consultants

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United Breweries Limited

United Breweries Limited (UBL), established in 1915, is amongst the largest social beverage (alcoholic and non-alcoholic) companies in India. And as a company, UBL has been serving the interests of all its stakeholders, including the communities around its operations. The company's Corporate Social Responsibility (CSR) policy reiterates its commitment to operate and grow its business in a socially responsible way – through balancing commercial and economic progress with social and environmental development.

The focus areas selected under its CSR policy are – environment, women empowerment, community development and address harmful use. Under the focus area of environment there is a great emphasis on water conservation initiatives, with as much as 70% of UBL's CSR investments going into this domain.

About the project

The current project 'Rejuvenation work at Nandi Lake and restoration of traditional structures (Kalyani and Gunduthopu) at Sultanpet village, Chikkaballapura district' was part of UBL's CSR work on water conservation, and the implementing partner was United Way Bengaluru (UWB). UWB is a 132- year-old organization with a global presence in more than 40 countries, with over 1800 chapters. The United Way Bengaluru (UWB) was started in 2008.

The original project duration was 41 months – it began in November 2017, and had to finish by March 2021. However, given the pandemic conditions, the project activities finally concluded by March 2022.

The original project document lists the key objectives of undertaking the Nandi Lake Rejuvenation project as follows –

- Restoration of quality of water in the lake; free from garbage, effluents and other pollutants
- Revival of eco-system in and around the lake by creating micro climate for aquatic flora and fauna
- To bring about community ownership through active volunteerism

While the lake and Gunduthopu/Kalyani were central to the project, other initiatives like rooftop rainwater harvesting, farm ponds, school level water harvesting, etc were also included.

The project activities thus comprised the following –

- Nandi lake restoration
- Restoration of traditional structures-Kalyani and Gunduthopu at Sultanpet village
- Construction of 262 rainwater harvesting units, 50 farm ponds, and 102 percolation tanks
- Clearing work for 3 inlets that feed rainwater to the Sultanpet/ Nandi Lake

- Construction of 3 pipe culverts
- Refurbishment of 3 Government schools, including the construction of additional 3 rainwater harvesting units
- Plantation of 3500 saplings

Impact Assessment

UBL commissioned an Impact Assessment of the above project with the following scope of work –

- Undertake a review of all the activities implemented under the project.
- Assess the quality of the infrastructure created through the projects.
- Evaluate the status and usage of the structures created.
- Assess community awareness around water conservation.
- Undertake site visits for validation of the data and conduct one on one meetings with the implementing partner, Gram Panchayat, and community to assess the effectiveness, efficiency & sustainability of the projects.
- Derive the standard framework basis national and international guidelines on calculations for measuring water recharge and rainwater harnessed.
- Review & validation of water recharge and conservation data provided by NGOs against this framework.
- Assessment of program results (outputs, outcomes & impacts) through stakeholder Key Opinion Former's (KOF) survey to develop KOF survey perception index and review of social benefits associated with the projects and the overall impact on the community.
- Drafting and submission of an Impact Assessment report.

The impact assessment of this project was undertaken by Nous Consultants, an independent agency consisting of senior development experts with leadership experience in corporate and civil society organizations.

The fieldwork for gathering data on the project was done in December 2023, more than a year after the project was completed.

The assessment approach consisted of extensive data collection (almost all beneficiaries were visited), and interviews with key stakeholders and informants including from the implementing agency, the Panchayat and community at large.

Key findings

The key findings of the project can be briefly summarized as follows –

a) The Nandi lake rejuvenation had an immediate and visible impact in the life of the community. The filling up of the lake was a moment of widespread celebration and joy. The impact in terms of higher water table in tube wells which had become dry was tangible for the downstream farmers.
b) The individual benefit interventions around building farm ponds and rooftop rainwater harvesting (RWH) systems have also been well received. The water storage tanks of most of the RWH systems and the farm ponds are still being used and maintained by the beneficiary families. The rainwater collection part has not been a need of families, and hence they are not using the same. However, the

water storage tanks have brought great assurance to families in terms of having an assured water supply, whether for household needs or crop needs.

c) The work done in other public places, like the Kalyani and Gunduthopu, have high recall among the public. One challenge is that the Panchayat, despite having taken the responsibility for maintaining these, has not done so. This could be due to lack of funds with the Panchayat (as stated by them) or due to changes in their leadership, or some other reasons.

d) In terms of awareness of the project among the community, the assessment team spoke with both beneficiary and non-beneficiary households, and found the awareness levels to be fairly high.

The impact assessment framework used for this assessment was the one developed by the OECD DAC Network on Development Evaluation. The framework uses six evaluation criteria to determine the merit of an intervention. These criteria are – Relevance, Coherence, Effectiveness, Efficiency, Impact and Sustainability. The project has done extremely well on Relevance and Impact, while scoring somewhat lower on Coherence, Effectiveness and Efficiency. The only major area for future consideration is the area of Sustainability.

Key recommendations

The project has been implemented well in a difficult overall context of the unanticipated pandemic. The following recommendations arise out of the learnings gathered in the course of implementing this project and which could be useful for future such initiatives –

a) Planning process

In case a project includes interventions which benefit individuals (such as farm ponds and rain water harvesting), it may be useful if the selection criterion includes both feasibility and need. The addition of need to the selection criterion will help in ensuring greater buy-in and subsequent utility of the asset.

b) Implementation

As a general practice, one should strive for the highest quality in public infrastructure, since recurring maintenance is difficult. This could be factored in while planning public initiatives in future projects.

Plantation related interventions need to include good systems to protect saplings from browsing and trampling, and their post-care. A choice of more hardy species will also help in ensuring greater survival rates.

c) Documentation

Documentation helps not only in post project follow-up, but also in concurrent tracking while the project is underway. UBL may like to consider asking implementation partners to geo-tag project locations so as to have precise location mapping of where the initiative is located. This is not expensive and would be a very useful addition to the documentation protocols.

Documentation of the status of key impact indicators (such as water level in tube wells) at the start of a project will be useful in claiming project impact on an ongoing basis.

d) People's participation

Ensuring community participation in any initiative is as essential as it is difficult. A community is not always cohesive and will have differing priorities. Hence, early and continuous investment in building up a sense of community engagement and ownership is critical.

Some good practices that can be considered are – an adequate preparatory time with the community to understand their priorities and practices, ensuring all stakeholder groups are represented in any community forum, exploring the possibility of including some component of community/individual participation in the project activities, and so on.

e) Sustainability

There is a great degree of overlap between people's participation and sustainability, and strengthening one leads to strengthening the other. But including a small sustainability component in community projects – such as staying on for some time after project completion or consciously building community institutions and their protocols – can help a lot in ensuring long term sustenance of project.

1. Background

1.1. About United Breweries Limited

United Breweries Limited (UBL) began in 1915, and is amongst the largest social beverage (alcoholic and non-alcoholic) companies in the country. As a company, UBL has been serving the interests of all its stakeholders, including the communities around its operations. As per the company's Corporate Social Responsibility (CSR) policy, it is committed to operate and grow its business in a socially responsible way by balancing the commercial and economic progress with the social and environmental development.

The focus areas selected under the CSR policy are – environment, women empowerment, community development and address harmful use. Under the focus area of environment there is a great emphasis on water conservation initiatives, with as much as 70% of UBL's CSR investments going into this domain.

UBL's CSR policy further states that UBL implements its major CSR projects through established NGOs with expertise in the desired thematic areas and a good connect with the local community. At times, the CSR initiative could be implemented by UBL directly.

The current project 'Rejuvenation work at Nandi Lake and restoration of traditional structures (Kalyani and Gunduthopu) at Sultanpet village, Chikkaballapura district' was part of UBL's CSR work on water conservation, and the implementing partner was United Way Bengaluru (UWB).

1.2. About United Way Bengaluru

United Way globally is among the oldest and largest privately funded charities in the world. It is a 132- year-old organization with a global presence in more than 40 countries, with over 1800 chapters. The United Way Bengaluru (UWB) was started in 2008.

Some of UWB's thematic areas of work are – access to health, early childhood success, youth success, economic mobility and environment sustainability. They have been actively working on two major campaigns, "Wake the Lake" and "Born Learning". With the "Wake the Lake" campaign United Way of Bengaluru has brought stakeholders together to revive existing water bodies.

UWB partners with NGOs and acts as the bridge between funders and implementers. Being strategically positioned as an aggregator of funds from corporates, individual donors and governments, UWB helps enable funding for local credible implementing NGOs. Till date, UWB claims to have worked with over 100 corporate partners.

The project under consideration (in Chikkaballapura district) was, however, implemented directly by UWB, and not through any local NGO partner.

1.3. About the Project

As mentioned earlier, water conservation is central to United Breweries' CSR strategy, and this project was undertaken in the water stressed Nandi Panchayat, which is officially

classified as an overexploited region[1], in terms of groundwater withdrawals. The project was commissioned by UBL with UWB as the implementing partner, for undertaking rejuvenation work at Nandi Lake and restoration of traditional structures (Kalyani and Gunduthopu) at Sultanpet village, Chikkaballapura district.

The original project documents from 2018, listed the key objectives of undertaking the Nandi Lake Rejuvenation project as follows –

- Restoration of quality of water in the lake; free from garbage, effluents and other pollutants
- Revival of eco-system in and around the lake by creating micro climate for aquatic flora and fauna
- To bring about community ownership through active volunteerism

While the lake and Gunduthopu/Kalyani were central to the project, other initiatives like rooftop rainwater harvesting, farm ponds, school level water harvesting, etc were also included.

The project activities thus comprised the following –

- Nandi lake restoration
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- Refurbishment of 3 Government schools, including the construction of additional 3 rainwater harvesting units
- Plantation of 3500 saplings

The original project duration was 41 months – it began in November 2017, and had to finish by March 2021. However, given the pandemic conditions, the project activities finally concluded by March 2022.

The impact assessment of this project was initiated in December 2023, more than a year after the project was completed.

1.4. Scope of work

The Request for Proposal issued by UBL for an Impact Assessment of the above project mentioned the Scope of Work as follows –

- Undertake a review of all the activities implemented under the project titled “Rejuvenation work at Nandi Lake at Nandi village and restoration of traditional structures (Kalyani and Gunduthopu) at Sultanpet village, Chikkaballapura district”.
- Assess the quality of the infrastructure created through the projects.
- Evaluate the status and usage of the structures created.
- Assess community awareness around water conservation.

[1] https://rajeev.in/?questionasked=over-exploitation-of-ground-water-in-karnataka

- Undertake site visits for validation of the data and conduct one on one meetings with the implementing partner, Gram Panchayat, and community to assess the effectiveness, efficiency & sustainability of the projects.
- Derive the standard framework basis national and international guidelines on calculations for measuring water recharge and rainwater harnessed.
- Review & validation of water recharge and conservation data provided by NGOs against this framework.
- Assessment of program results (outputs, outcomes & impacts) through stakeholder Key Opinion Former's (KOF) survey to develop KOF survey perception index and review of social benefits associated with the projects and the overall impact on the community.
- Drafting and submission of an Impact Assessment report.

2. Assessment framework

The impact assessment draws upon the evaluation criteria defined by the OECD DAC Network on Development Evaluation[2]. The six evaluation criteria – relevance, coherence, effectiveness, efficiency, impact and sustainability – a provide a normative framework used to determine the merit or worth of an intervention (policy, strategy, program, project or activity). They serve as the basis upon which an assessment of the project activities, outcomes and achievement of stated aims and goals is made.

Figure 1: OECD DAC Framework

The above criteria are to be used along with 2 principles – one, the criteria should be contextualized (understood in the context of the individual evaluation, the intervention being evaluated, and the stakeholders involved); and two, the criteria should not be applied mechanically (but according to the needs of the relevant stakeholders and the

[2] OECD DAC Network on Development Evaluation

context of the evaluation; more or less time and resources may be devoted to the evaluative analysis for each criterion depending on the evaluation purpose).

3. Assessment methodology and limitations

3.1. Methodology

The impact assessment at Nandi Panchayat was carried out in the following phases –

Preparatory Phase	• Review of project proposal and MoU • Review of project reports • Inception meeting with UBL and United Way Bengaluru • Plan for data collection and development of tools
Field Assessment and Data Collection	QUALITATIVE • Visit Nandi lake, Kalyani and Gunduthopu tanks, plantation sites • Visit 3 schools to assess the rejuvenation activities and RWH structures • Visit sample locations of percolation tanks and plantation site • Meetings with project beneficiaries of rainwater harvesting units, farm ponds • Meetings with members of Gram Panchayat and Lake Development Committee
Intensive field verification and data collection	QUANTITATIVE • Finalization of tools for data collection • Census approach to data collection on rainwater harvesting units, farm ponds and percolation wells
Analysis	• Analysis of qualitative and quantitative data • Analysis of volumetric water benefit report
Report Writing	• Sharing of preliminary findings with UWB and UBL teams • Report and final presentation preparation

Figure 2: Assessment phases

The preparatory work began in December, and the field work was carried out by a team of two senior experts and 5 experienced surveyors (under a supervisor) from 21st to 31st December 2023. The data analysis, discussions and report writing was done over January-February, 2024.

Given the nature of the interventions carried out in Nandi – a few localized initiatives (Nandi lake, Gunduthopu, Kalyani, Schools, plantation) along with several smaller and decentralized initiatives (rooftop rainwater harvesting, farm ponds, percolation wells) – and given that the scope of work mentioned an assessment of current status and usage of these, it was decided that the assessment team will try and visit each and every intervention on the ground, in a census approach (and not a sample approach).

The assessment plan that was agreed upon was as follows –

Lake rejuvenation	• Visit to lake, pipe culverts and inlet channels – status and upkeep • Condition of borewells in the Panchayat before and after the lake work • Impact on agriculture, livestock – through Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs).
Rooftop rain water harvesting	• Visit all 262 units – current status, usage • Survey women to understand benefits from their perspective – expenditure reduction, drudgery reduction, any other • Also ask them about other interventions in the village and benefits of the same
Gunduthopu and Kalyani	• Review current status, upkeep and usage • Interview key informants
Farm ponds	• Visit all 50 farm ponds – current status and usage • Interview all owners about changes in crop productivity and crop patterns
School refurbishment	• Visit all 3 schools – review current status of interventions • Qualitative interviews with some students and teachers about perceived impact of interventions
Plantation	• Sample counting to make an estimate of current survival rates. • Species planted to be able to comment on bio-diversity
Percolation wells	• Census of all 90 percolation wells – their current status and upkeep • Interview key informants on any perceived changes due to wells

Figure 3: Assessment plan

3.2. Limitations

One limitation faced during the assessment was the ready availability of beneficiary lists, including the precise location of the interventions. Since the proposed methodology was one of a census approach covering all beneficiaries, not having accurate lists affected the process. The survey team tried to cover the gaps in data, to the extent possible.

We understand that this gap may have arisen in part due to the disruptions caused by the pandemic, and due to staff turnover within the implementing agency.

Another limitation was that some families were not in the village at the time of the survey, hence their perspectives could not be included.

The absence of baseline data on some key impact metrics like the pre-project bore-well water levels, cropping mix, etc hindered a more precise assessment of impact. However, the study team covered those aspects through a more qualitative enquiry.

4. Observations and Findings

4.1. Context

Chikkaballapura district in Karnataka was carved out of the pre-existing Kolar district on 23 August 2007. The district's headquarter is Chikkaballapur which is just 50 km from Bengaluru. The average annual rainfall is only 677 mm. The district experiences tropical climate throughout the year. Prosperity of the district can be attributed to the ancient tanks in the district, there are about 1243 tanks in the district. There are no perennial rivers in the district. Main occupation in the district is agriculture and due to absence of surface water irrigation system, there is sole dependency on the ground water which is now affecting the region[3].

As per the 2011 census, Chikkaballapura district had a population density of 298 inhabitants per square kilometre (against an all India average of 382), and its sex ratio was 972 females for every 1000 males, compared to India's sex ratio of 943. Its literacy rate stood at 69.76% and the per capita annual income of the district in 2012-13 was Rs. 44,183. As per the 2011 census, Scheduled Castes and Scheduled Tribes make up 24.90% and 12.47% of the district's population respectively[4].

Its proximity to Bengaluru has opened up possibilities of floriculture and also the setting up of food processing units (the assessment team even came across a Gherkin processing unit in Nandi Panchayat). The main crops grown are grapes, pomegranate, lemon, bananas and even silk rearing. The district produces approximately 0.7 million liters of milk per day. These are however water intensive crops, and therefore have an implication on groundwater extraction and availability.

The central ground water bureau 2012 report states that Chikkaballapur taluk falls under 100% over exploitation of ground water category. This is also corroborated by the fact that the taluk has the highest number of borewells that had dried up (618 dried up borewells against 930 in the entire district!). To ensure sustainable development in the district the report recommends construction of water conservation structures such as check dams, sub surface dykes, surface tanks, bunds etc[5].

The current project is located in Nandi Gram Panchayat, of Chikkaballapur Taluka and District. Nandi GP comprises of the following villages – Singadikadirenahalli, Bairanayakanahalli, Sulthanpet, Madakuhosahalli and Nandi. The central tourist attraction of the area is the ancient hill station of Nandi Hills.

There are many stories about the origin of the name Nandi Hills. During the Chola period, Nandi Hills was called Anandagiri meaning The Hill of Happiness. It is also perhaps called Nandi Hills because the hills resemble a sleeping bull. Another theory holds that the hill gets its name from an ancient, 1300-year-old, Dravidian-style temple, and for the Nandi (bull) statue situated on this hill. Whatever be the reason, but the hills do attract a lot of

[3] Chikkaballapura District Profile.
[4] Chikkaballapura District Profile.
[5] Project closure report, UWB

Photo 1: Nandi Gram Panchayat, as seen from top of Nandi Hill

tourists to Nandi Gram Panchayat. In fact, the first ever SAARC summit hosted by India was also held at Nandi Hills in 1986.

According to Panchayat level data collected during the course of the assessment, the total households in the Panchayat (across the five villages) is 1648. Nandi is the largest village, accounting for 928 households (56% of the total), whereas Madakuhosahalli is the smallest village, with only 60 households.

In terms of the demographic profile, nearly 50% of the households in Nandi Panchayat are from General Caste, while Scheduled Caste and Muslims are roughly equal at about 20% each, and the balance consists of the Scheduled Tribe households.

Between 2011 to 2013, infrastructure for piped water supply to the households in Nandi GP was developed. Over 95% households in the two largest villages, Nandi and Sultanpet have piped water connection, while in other villages 90% households have piped water connection. Water is supplied every day to the smaller villages, while Nandi and Sultanpet villages get piped water supply every alternate day.

There are two drinking water filtration systems in Nandi village which started in September 2023, which sell 20 liters of filtered water for Rs 5 each. One unit is run by Dharmasthala Sangha Trust, and the other by Mr. Sudhakar, MLA of the region. The former sells 15,000 units per month and the latter sells 6,000 units per month. There are similar filtration systems in the other villages.

4.2. Respondent coverage

As mentioned in the methodology section, the assessment team followed a census approach (as far as feasible), of collecting data on each intervention and meeting as many of the individual beneficiary households as possible. Alongside, we also interviewed some non-beneficiary families. In all, we covered 362 HHs across Nandi Gram Panchayat, which is 22% of the total HHs in the Panchayat.

The assessment used the beneficiary lists as the starting point, and then supplemented the same through actual field enquiry and stakeholder conversations. Given below is the

actual assessment/respondent coverage, including both from the lists supplied to us by the implementing agency and from the beneficiaries discovered on the ground.

The final interview/field visit coverage was as follows –

S No	Households visited (HHs)	Total beneficiary HH list as given	HHs visited by survey team (from the list)	HHs visited by survey team (apart from the list)	Total HHs visited by survey team
1	RWH systems	282	260	14	274
2	Farm ponds	50	50	3	53
3	Non-beneficiary HHs met	0	0	35	35
	TOTAL	332	310	52	362

Table 1: Households visited by survey team

Apart from the 362 visits and personal interviews, we also met with several other relevant stakeholders. These included –

- Panchayat Head
- Panchayat functionaries
- Lake Committee members
- School teachers
- Community members living close to the Gunduthopu and Kalyani
- General community members.

4.3. Findings

We share in this section detailed assessment findings for each of the interventions that were undertaken as part of this project.

A. Nandi Lake Rejuvenation

Nandi lake or Sultanpet tank as it is also called is spread over 38 acres. The lake catchment area is surrounded by four hills namely, Nandi hills, Channagiri hills, Omkareshwara hills and Hyderali betta. In the same zone is located origin of Dakshina Pinakini River.

The lake series has seven lakes down streams and hence Nandi Lake is strategically very important as this lake feeds other lakes downstream and supports the lives and livelihoods in nearby villages. A key problem identified in the early phases of the project was the common

Photo 2: Nandi/Sultanpet Lake

complaint that a large number of bore wells in the area had dried up.

According to the Project Completion Report, some of the challenges shared by the villagers towards reviving this lake were: blocked inlets that otherwise could have facilitated water flow from the valleys to the lakes directly, sand mining in the lake bed had made the lake bed uneven affecting water storage capacity and subsequently reduced green cover affecting the rain capture in the area.

UWB commissioned a Detailed Project Report, basis which the following set of activities were taken up:

ACTION	EXPECTED OUTCOME
Desilting and levelling of the lake bed	Enhanced storage capacity of the lake
Bund revetment	To strengthen the embankment thus adding longer life to the lake body, and to reduce any leakage from the bund
Cleaning of inlet channels (21-22)	To maximize the inflow into the lake from the catchment
Plantation on the lake bund	To improve the green cover
Formation of a Lake Committee	For long term community ownership and sustainability

Table 2: Project Activities and Expected Outcomes

Following is what was found during the survey on each of the above interventions –

i. Desilting and levelling of the lake bed

This work began with obtaining administrative approvals for shifting the electricity poles which were in the lake-bed. Given that the lake had not filled up for several years, sand mining from the lake-bed had become a rampant practice, leading to not only the loss of the fertile sediment layer, but the digging of the sand pits leads to a very uneven lake bed.

The implementing team managed to get all the approvals and the work was completed in the year 2020-21. In the subsequent rains of 2021, the lake filled up to the brim after a long time.

When the review team visited the site in December 2023 – roughly 2.5 years after the lake bed cleaning had been done – it found the lake was still full. During our meetings with farmers and community members, we asked them why was the lake now full – and most people were emphatic that the work done by UWB/UBL had contributed to this, though many also said that in the past the rain had been poor and thus the lake had stayed empty.

We found rainfall data for the last 50 years for Karnataka State and for South Interior Karnataka (consisting of 11 districts of Karnataka, including Chikkaballapur). These tables[6] present the percentage departure on annual rainfall since 1971, for Karnataka State as a whole and for South Interior Karnataka region. If we look at these tables, while Karnataka as a whole had experienced deficient rainfall since 2010 to 2019, the same cannot be said for South Interior Karnataka. Hence, while the public perception may be that the lake filled up in 2021 due to both the repairs that were carried out and due to more abundant

[6] Rainfall, agricultural situation, moisture index, reservoir levels, minor irrigation, in Karnataka – 2022

rainfall, the facts seem to suggest that the lake filled up in 2021 (and has been filling up ever since) primarily because of the lake rejuvenation work.

Table 3: Karnataka - 50 year rainfall deviation data

The percentage departure of Annual rainfall from Normal for the State as a whole since 1971 is given in the following Figure 1.1:

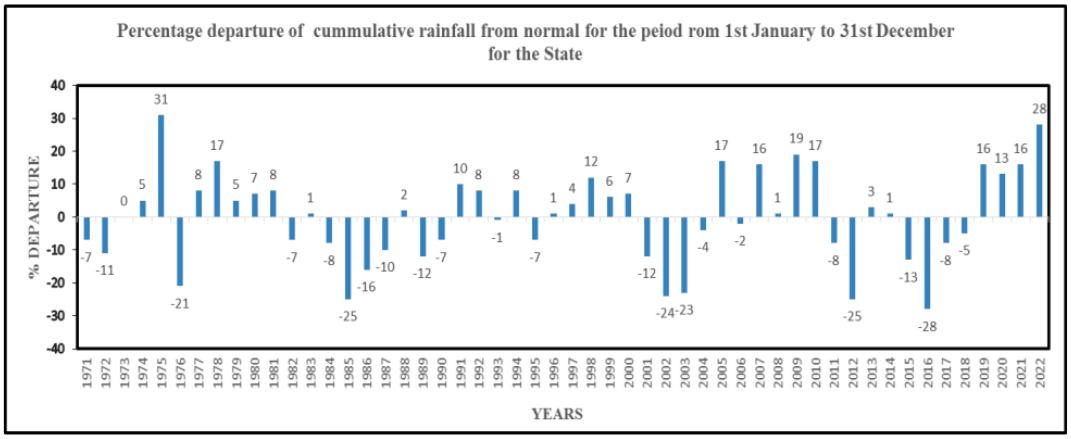
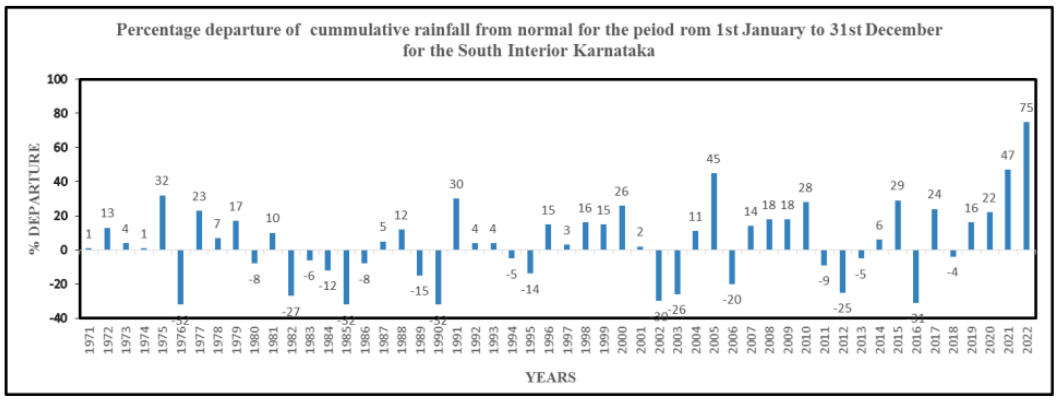


Table 4: South Interior Karnataka - 50 year rainfall deviation data

The departure (%) of the Annual rainfall from Normal in South-Interior Karnataka since 1971 is given in the following Figure 1.3:



We tried to understand the impact of the lake repair work in terms of the agriculture. Majority of farms in Nandi Gram Panchayat are growing cash crops like grapes, roses, pomegranate etc. Ragi is now sown in a very limited area. All the cash crops mentioned are multi-year crops, where the plants continue to provide harvest for several years.

Since the establishment of these crops requires a fair amount of initial investment, the cropping mix cannot be changed very frequently. Several of the farms visited in the immediate vicinity and downstream of the lake are growing these cash crops, many of which had been planted 5-10 years ago. Hence, it cannot be said that the work on the lake has led to a marked change in agriculture in the region. However, several farmers did report an improvement in the water table in their bore-wells. That is a region where groundwater table is anywhere between 400-700 feet low, and any improvement in the

same makes a lot of difference to the families. We did not have a list of bore-wells and their water levels before the project, hence we cannot speak precisely about the post-project water levels.

ii. Bund revetment

Revetments are sloping structures on embankments, normally built of stone, in order to absorb and dissipate the energy of incoming water and protect it from erosion. The Nandi lake has an earthen bund with stone pitching work on the embankment. Over years, this had become damaged and extensive repairs of this were carried out in the project. The idea behind undertaking these repairs was to add to the life of the bund as also to prevent seepage losses through cracks in the bund.

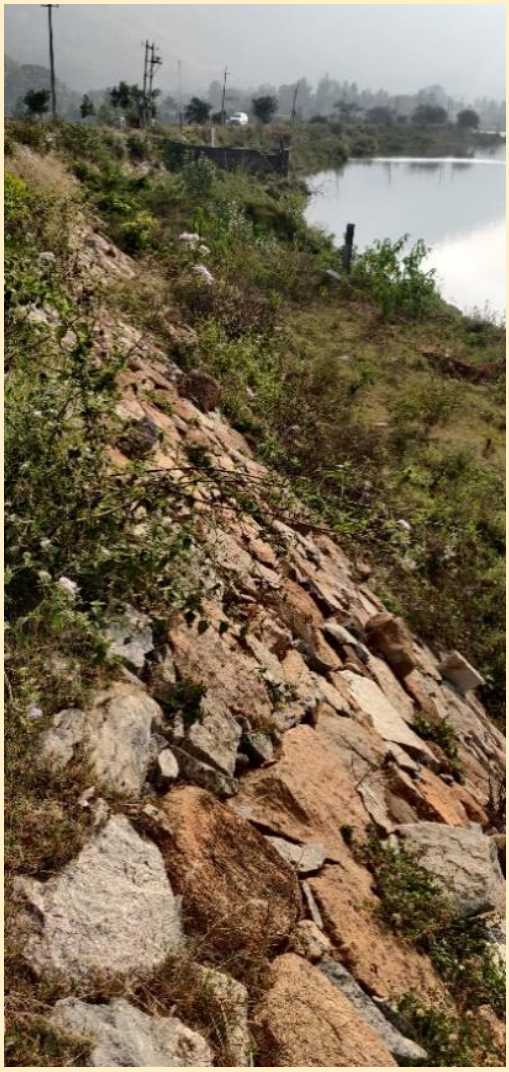


Photo 3: Lake bund – current status

At the time of the visit in December 2023, the study team found that the bund revetment work was again in need of repairs. The UWB team had, at the time of handover, obtained a commitment from the Gram Panchayat that they would take care of maintenance, but that has not been upheld.

As a result of this, currently there is water leakage happening from the bund into the adjacent fields.

iii. Lake Committee

UWB had formed a Lake Committee comprising of local men for overseeing the lake rejuvenation work. They were also part of the exit strategy, whereby they were supposed to own and maintain the project (along with the Panchayat).

The study team met with several Lake Committee members, all of whom said that the Committee had not had any meeting since the project got over. There also seemed to have been no clear protocols that had been put into place as to how the Committee would function once the UWB team exited, and what would be the Lake Committee's role vis-à-vis the Panchayat. Further, it appeared that there were no women members in the Lake Committee.

Following are pictures of the Lake Committee members we interviewed:

Photo 4: Laxmi Narayana

Photo 5: Prakash

Photo 6: Navin

B. Rooftop Rainwater Harvesting

Rooftop rainwater harvesting (RWH) is a simple technology, which helps families store some of the rainwater for later use. The system designed and installed at Nandi Panchayat consist of the following components – an underground tank to store rainwater, a pipe and plumbing system which diverts the roof rain water to the underground tank, a filter to remove sediments and other debris before the water enters the tank and finally, a hand-pump which is installed on top of the tank to draw out the stored water.

Selection criterion and number of RWH beneficiaries

The selection criterion used by UWB for deciding on the beneficiaries of the RWH was as follows –

- First priority given to houses which do not have private bore well or open bore well.
- The house roof must be permanent one and feasible for the RWH unit.
- Technical committee (Engineer & UWB staff) will do the feasibility assessment
- Available space for underground sump construction has to be provided by the house owner
- The house owner shall do the excavation for sump with his own cost or his own manpower within the given time.
- Beneficiary has to take care of minimal maintenance like roof cleaning, sump cleaning etc.

According to UWB, their focus was on reaching the tribal and other marginalized communities who are facing hardships with respect to water. As per the completion

report, UWB had built 262 RWH units in the Panchayat. The survey team's aim was to assess the functioning of all the 262 household RWH structures. However, the list of beneficiaries that was provided by UWB actually had 282 names. Some of these names were duplicate and some addresses could not be located. The survey team was able to locate and visit 274 households from this list of 282 beneficiaries.

Table 5: Profile of HHs visited for the Rooftop Rainwater Harvesting (RWH) intervention

S No	Village	Total HHs	% of total HHs	HHs visited by survey team	% of total HHs
1	Nandi	928	56	100	36.5
2	Sultanpet	420	25	100	36.5
3	Singatakadirenahalli	145	9	25	9
4	Byranayakanahalli	95	6	24	9
5	Modaku Hosahalli	60	4	25	9
	TOTAL	**1648**	100	**274**	100

The demographic profile of the RWH beneficiaries is as follows, and correlates with the overall demographic profile of the village.

Table 6: Demographic profile of RWH beneficiaries

Demographic group	Percentage of population in Nandi Panchayat	Percentage of beneficiaries
SC	20%	26%
ST	11%	18%
OBC	19%	31%
General	50%	25%
Total	100%	100%

Table 7: Land ownership profile of RWH beneficiaries

Landholding	SC	ST	OBC	General	Total
0 to 2.5 acres	27%	18%	30%	25%	100%
2.5 to 5 acres	12.5%	25%	37.5%	25%	100%

A majority of the RWH beneficiary families – 94% – have piped water connections from the Panchayat and 16% families have their own bore-wells as well.

Table 8: Other water sources with RWH beneficiaries

Sources of water	SC	ST	OBC	General
Own bore-well	11%	24%	24%	4%
Panchayat tap	92%	94%	95%	98%

On-site assessment findings

i. RWH Units found

Of the 274 households that were visited, 231 had RWH units. Some of those who did not have the RWH unit were probably included initially but later on left out since the site may not have been found to be suitable.

The survey team, through a kind of snowball enquiry, found another 14 households which had a project/UWB RWH installed at their home.

So, in all, the survey team found 245 RWHs in the field – 231 from the list provided and 14 which were not in the list.

ii. Status of RWH units

The following observations are based on the surveyor visit and observations of the actual condition of the RWH units found in the 245 households.

Table 9: Status of RWH Systems

S No	Description	Number	Percentage
1	Total RWH Units found	245	
2	RWH Units with rainwater pipe connected at tank level	119	49%
3	RWH Units with rainwater pipe connected at the roof level	82	34%
4	RWH Units with functional filter	86	35%
5	RWH Units with functional hand pump	69	28%
6	RWH Units totally unused or abandoned	25	10%

Some feedback from the household level survey

Out of the total of 245 RWH households that were identified, 65 homes were found locked or the family had not been in the village for a long time. In such cases, we could not interview the owners, but the team did include its observations on the RWH structure. The interview responses are hence from 180 families (out of 245) that the survey team could actually meet. Following are some highlights from these responses –

i. Permanent/pucca roof

As per the selection criterion, the roof of the concerned household must be pucca/permanent and feasible for a RWH system. 94% of the 180 households who participated in the survey had pucca houses with concrete roofs.

ii. Training received

The implementing agency UWB had provided training to the RWH beneficiary households in how to maintain and look after their RWH system. The survey team asked the households about the same. 104 out of the 180 respondent families – about 58% families – said that they had received the training. The training was provided on-site and was mostly about how to look after the filter.

iii. Frequency of cleaning of tank

In order to ensure that the water in the underground tank of the RWH system stays clean, the tank needs to be cleaned regularly. This is a new task that has emerged at the household level and the survey team tried to understand how often are families cleaning the tank and more importantly, who is cleaning it.

In terms of cleaning frequency, most households seem to be cleaning in once in 3 to 6 months, followed by a once in 2-months cleaning periodicity. There are also a fair number of families (15-17%) who said that they have never cleaned the tank.

Table 10: Frequency of cleaning the RWH tank

Tank cleaning frequency	SC	ST	OBC	General
Never	19%	9%	22%	15%
Once since installation	0	0	7%	0
Once a month	11%	21%	16%	27%
Once in 2 months	17%	30%	20%	29%
Once in 3 to 6 months	49%	37%	33%	22%
Once in a year	4%	3%	2%	7%
TOTAL	100	100	100	100

The survey also asked about which household member has taken the responsibility of this new task of cleaning the tank. It was very heartening to find that the new workload has been evenly divided among all household members, with actually men taking up marginally greater responsibility for it. 25% households said that everyone does it. 14% of male respondents said they clean the tank, and 14% of female respondents said they clean the same. Another 19% of female respondents said that the tank is cleaned by either their husband or their son. Hence, in terms of any unintended consequences on women's workload, this intervention has actually only helped women through easier water availability and not added to their workload.

iv. Benefits of having an RWH tank

We asked the respondents about what was the biggest benefit of having an RWH tank, as experienced by them.

Of the 180 families surveyed, 95% families across caste groups perceive the key benefit of the RWH to be a General Water Storage Tank. Around 52% perceive its benefit for storing rainwater.

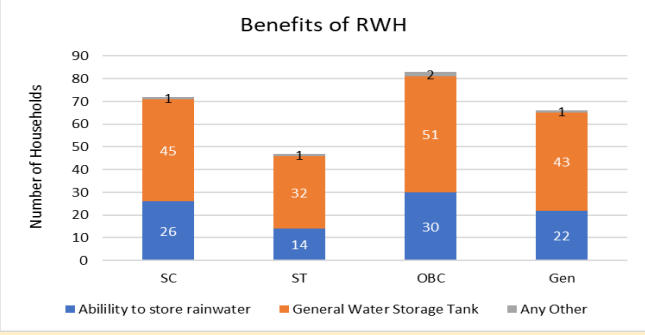


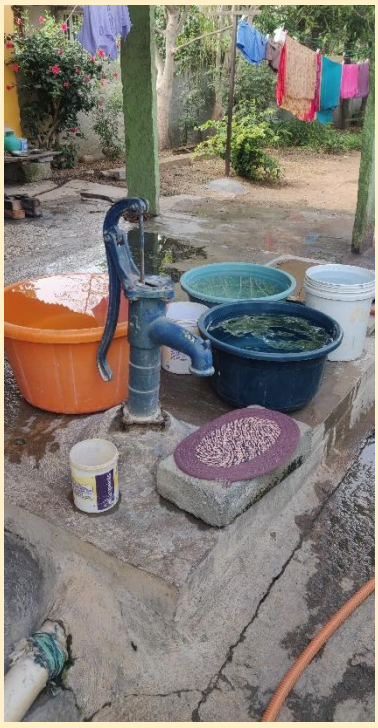
Figure 4: Beneficiary perception on benefits of RWH

Overall, if we define a fully functional RWH system as a water tank which has the water pipe connected to the roof and to the tank, a functional filter and a functional hand pump, then we can say that only 31 out of 180 RWH systems (17%) are currently fully functional.

Photo 7: Field photos of some RWH Systems







C. Restoration of Kalyani and Gunduthopu at Sulthanpet

Kalyani, also called *Pushkarni*, are ancient Hindu stepped bathing wells. These wells were typically built near Hindu temples or built as part of the temple complex to accommodate bathing and ritual cleansing activities before prayers and during rites of consecration.

A *Gunduthopu* is primarily a woodlot—a green space reserved for public purposes. These areas serve as points for bird watching, bushwalking, and small-scale production of forest products, including wood fuel. Thopus, in addition to the trees, support considerable flora and fauna, including birds, butterflies and ants. They also help regulate the micro-climate, keeping the temperatures low. Thopus used to be an integral part of the rural landscape in the past, but with increasing urbanization, they have come under more and more threat of encroachment and misuse.

Restoration of both the Kalyani and the Gunduthopu at Sulthanpet were taken up as part of this project. The Gunduthopu at Sulthanpet also has a small pond inside which serves as a source of water for the birds and animals. According to the project completion report, under this project, complete restoration work was undertaken with levelling, soil topping, turfing the grass and putting up a stone bench at the Gunduthopu. There is a small pond inside the Gunduthopu, which was also cleaned. In addition, extensive plantation was also undertaken here. At Kalyani, following works were undertaken – desilting, water body cleaning, repair/replacement of stones and plantation.

Photo 8: New plantation and some old trees at Gunduthopu

On-site observations –

i. Both the Kalyani and the Gunduthopu are very important public goods to be protected and nurtured, as clean and green spaces for a village. In that sense, the interventions are well selected.
ii. From the immediately 'after-intervention-photos' that are part of the completion report, the work had made a lot of difference to the condition of these two public spaces. However, the challenge appears to have been lack of maintenance on part of the Panchayat, because of which both the Kalyani and the Gunduthopu today appear dilapidated again.
iii. The grass turfing work carried out at the Gunduthopu has now taken root. However, in the absence of any markings, it is difficult to precisely count how many of the new plantation is still surviving.
iv. According to UWB, subsequent to the project completion, nearly one-third of the Gunduthopu area was covered under a road leading to the loss of some saplings that had been planted there.
v. Among the general public, the work carried out at both Kalyani and Gunduthopu are recalled as good interventions. However, both these spaces need regular maintenance from the Panchayat.

D. Enriching bio-diversity

As per the project documents, plantation was undertaken at two locations in the Panchayat – the Gunduthopu and on the bund of Nandi Lake. A total of 3500 saplings were planted and are surviving. The main purpose of this intervention was to enhance soil and water conservation in the area. The saplings were planted over 2019, 2020 and 2021.

Photo 9: Plantation on the lake bund near the overflow

As mentioned in the previous section, the grasses and ornamental trees planted at the Gunduthopu were visible. The fact that about one-third of the Gunduthopu area has been taken up for building a road, some of the saplings were lost in this.

The plantation work on the lake bund was undertaken with the twin purpose of strengthening the earthen bund (tree roots would prevent erosion of the soil from the bund) and to create a green and pleasant environment near the lake. During our visit to the lake, we were informed that 299 saplings had been planted there. However, in the absence of any tree-guards or other kind of markings, it was difficult to distinguish the planted saplings from any natural regeneration or pre-existing plants.

E. Farm ponds

Farm ponds are the water storage structures that help store rainwater and use it for irrigation. These farm ponds are particularly useful in terms of providing an on farm water storage facility which can be used specially for emergency irrigation. In the Nandi context, dug out type farm ponds were opted, with the idea that these ponds could be used for both irrigation and fish farming purposes.

A total of 50 farmers were identified who needed farm ponds. The construction steps involved, excavation work (20 ft length, 20 ft width and 10 ft depth), an inlet chamber along with a silt trap, a feeder channel and finally, fixing a 60 gauze plastic sheet to line the entire pond (to prevent seepage losses).

The total farm ponds made under the project are reported to have been 50. During the field verification, we were able to find 45 of these farm ponds. Further, through a snowball enquiry method, the survey team found 3 other farm ponds that were not in the original list provided. Hence, the survey found a total of 48 farm ponds on the field.

Following is the distribution of these farm ponds across the panchayat –

Table 11: Distribution of farm ponds

	Bairanayakanahalli	Madakuhosahalli	Nandi	Singadikadirenahalli	Sulthanpet	Total
Reported	5	5	23	8	9	50
Identified	5	5	23	7	8	48

i. Farm pond – beneficiary profile

Of the 48 farm ponds that were located, we could survey 36 of the owners. The profile of the respondents indicates that a majority of the farm pond beneficiaries are from the General Caste. Further, nearly half of the beneficiaries are from Nandi village only.

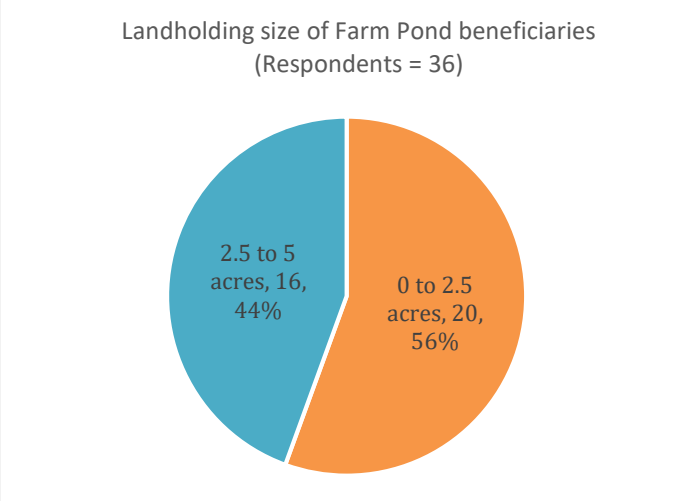


Figure 5: Profile of farm pond beneficiaries

Of the 36 beneficiaries who could be interviewed, 35 families have their own land which they cultivate, while one family (SC) cultivates on leased land. Of these, 28 families also rear livestock. 8 of the respondents (22% farm pond beneficiaries) also have a salaried job.

Further, 20 families are marginal farmers with less than 2.5 acres of land and the other 16 families are small farmers with land holding of 2.5 to 5 acres.

75% of the respondents have a bore well or tube well on the farm.

ii. Status of farm ponds

The status of Farm Ponds was assessed in terms of whether the farm pond was being used or not, its condition and whether it was being filled using rainwater or using other water source or both. Other than asking the beneficiary, we triangulated through looking at whether the rainwater inlet pipe is connected with the pond and whether the stone filter is working. We also looked for whether the tank was being filled using other water sources.

As against 50 farm ponds reported to have been built, a total of 48 farm ponds were found during the survey, of which 15 farm ponds (31%) were totally unused or abandoned.

Further, if we look at separate elements of the farm ponds, less than 25% of farm ponds have an inlet for taking in rainwater and only in 17% of the farm ponds the stone filter is working.

In terms of how the farm pond is filled with water, only one respondent filled it with only rainwater. Majority of respondents fill the farm pond using only either the tube well water or using both rainwater and tube well water.

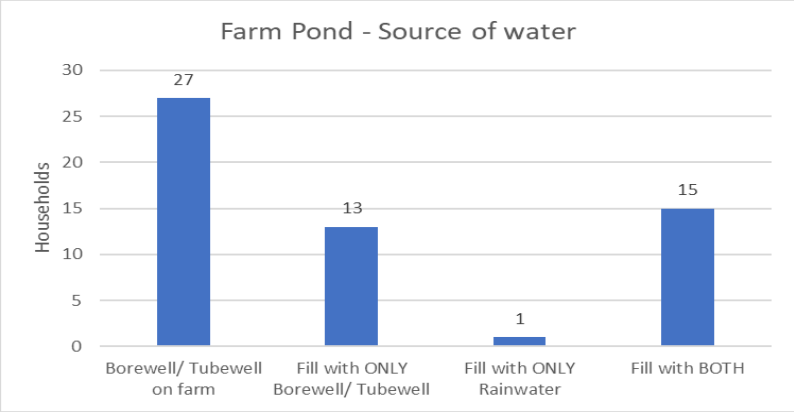


Figure 6: Farm ponds - sources of water

On looking at how the farm ponds are actually being used, these are primarily being used as a water tank, though not as much as a rainwater holding tank. Majority of the farmers also have their own tube well on the farm. When asked about the utility of the farm pond, given that they have their own tube wells, several spoke of the erratic electricity supply, and hence the farm pond is used to store the tube well water when there is electricity. Irrigating the crops using drip irrigation becomes much easier and reliable from the farm pond.

iii. Impact

Having a water body on the farm certainly increases the farmer's confidence in that he is assured of water if needed at a critical stage of cultivation. We looked at how this would have impacted the choice of crops being grown. The adjacent table shows how majority of farmers are using the farm ponds to irrigate horticultural and floricultural crops like grapes, pomegranate, roses, etc. These

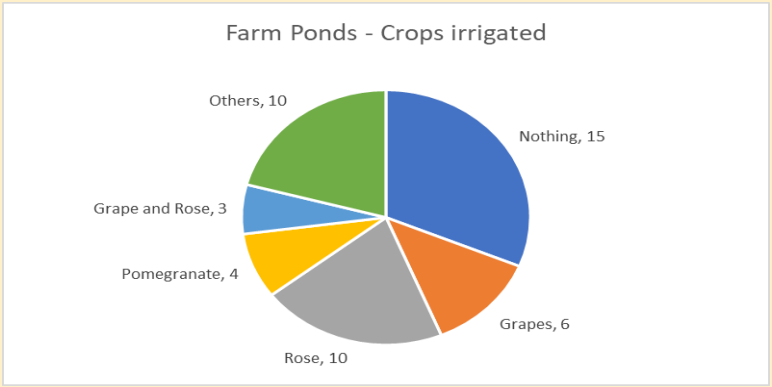


Figure 7: Farm ponds - crops irrigated

are all long term plantations, and suggest that the same crop pattern was possibly in place even before the project. The category 'other' includes vegetable crops such as tomatoes, cucumber, beans, and at times ragi. Only one farmer mentioned doing fisheries in the farm pond.

F. Government school refurbishment and rain water harvesting unit construction

As part of the integrated rural development initiative undertaken in this project, apart from other activities listed here, it was also decided to refurbish and provide water security measures to the three government schools in the gram panchayat namely, Nandi high school, Nandi primary school and Sulthanpet primary school.

We share below, the school wise activities that were undertaken as per the completion report, and the actual status as found on the ground during December 2023.

i. Nandi high school

At the high school, the project undertook civil work such as painting, masonry work and grill work for two buildings of the schools and construction of a roof top rain water harvesting unit.

Photo 11: Pipe connections

Photo 10: Underground tank

During the visit, we found the rainwater harvesting unit to be in complete working condition. The pipes were in place and connected. The underground storage tank has a capacity of 14000 litres, and was full. The filter could not be seen since it was inside a locked room, but from the overall appearance of the system, it appeared a well-functioning system. The school reported that the tank is filled with rainwater during the rains, and subsequently, it is filled from the Panchayat water supply. The water is used for cleaning and gardening.

The school has 2 other RWH tanks of the same size, which are filled using the school's own bore well (1000 feet deep).

It is a large school and they are extremely appreciative of this support, which has added another valuable water storage facility to the school, and certainly during monsoons, the load on their water source is lessened since rainwater gets stored.

ii. Nandi higher primary school

At the Nandi higher primary school, as per the completion report, following interventions had been undertaken – toilet block roof work, roof replacement, flooring and painting work including construction of a roof top rain water harvesting unit.

The survey team were told during the site visit that no rain water harvesting unit had been installed in this school, though toilet repair work had been undertaken.

Photo 12: Nandi higher primary school

Photo 13: Painting work at the school

At the Nandi higher primary school, the painting and beautification work is very much visible though the toilets need repairs.

iii. Sultanpet primary school

The work undertaken at the Sulthanpet primary school included flooring, painting, water proofing and toilet repair works including construction of a roof top rain water harvesting unit.

The flooring, painting and toilet work at this school were found to be in fairly good condition. However, we were told on site that the RWH tank already existed in the school, and the project had only provided the pipes and the filter. The filter and the pipes were disconnected and currently not in use.

Photo 14 Primary School

G. Percolation wells

The focus of this project was towards improving groundwater recharge and groundwater levels. The benefit of a recharge/percolation well is that it holds rainwater and allows it to gradually percolate in the substrata, thereby improving water recharge. In turn, this would also lead to improved vegetation and improved ground water levels in the long term.

With this focus, the project completion report mentions that a total of 90 percolation wells were constructed across multiple areas in the Nandi gram panchayat area. These areas include, Govt hospitals, forest land and other Government owned open and common spaces.

The process of constructing percolation wells begins with digging a 12 feet deep narrow well. This is packed from below and cement rings are then lowered into the well to hold the sides. The well is then closed with a lid which has holes for water to go into the well. Each of the well that serves as a recharge well is expected to hold and percolate about 106,500 meters of rain water in a given rain year.

Percolation well numbers

The assessment team was provided a list of 90 percolation wells across different locations in Nandi Panchayat. The team however, found the following wells –

Table 12: Percolation wells - reported and actual

Location	Percolation wells as reported	Percolation wells as found
Government hostel/Samadhi place, Nandi	13	10
Nandi primary health center	14	10
Nada kacheri (government office premises)	10	0
Gunduthopu, Sultanpet	10	2
Forest department nursery, Sultanpet	31	31
Channakeshawa Swamy temple Gunduthopu, Sultanpet	5	0
Near Sai baba ashram, Sultanpet	6	6
Near government school, Sultanpet	1	0
Muthyalama temple ground		10
Inside British Graves ground		12
TOTAL	90	81

Overall, we found 81 percolation wells.

Status of Percolation Wells

We looked at the status of the percolation wells in terms of assessing their actual depth, assessing whether they were well maintained, and whether they were being effective recharge bodies.

Following was the status of these 81 wells –

Table 13: Status of percolation wells

Location	Percolation wells found	Wells with clean, visible tops	Wells still having water	Average length of water column
Government hostel/Samadhi place, Nandi	10	9	1	3'
Nandi primary health center	10	4		
Nada kacheri (government office premises)	0	0		
Gunduthopu, Sultanpet	2	2	2	3'
Forest department nursery, Sultanpet	31	2	9	1.56'
Channakeshawa Swamy temple Gunduthopu, Sultanpet	0	-		
Near Sai baba ashram, Sultanpet	6	4	5	4'
Near government school, Sultanpet	0	-		
Muthyalama temple ground, near Nandi hill stairs, Sultanpet	10	6		
Inside British Graves ground, Sultanpet	12	9	12	3'
TOTAL	81	36	29	
%		44%	36%	

i. Quality of work

All the percolation wells that were found had the stated depth of 20 feet and the top lid was strong, well painted and numbered. Following from this, we can state that the inside work quality is also likely to be quite good.

Photo 15: Percolation wells with clean visible tops

ii. Maintenance

Of the 81 percolation wells that were found, only 44% of them had clean, visible tops. This is important since the only flow into the well is from the top, and if the holes on the top get fully covered, then the well's effectiveness will gradually diminish. Hence, the well tops require regular maintenance (at least once a year, before the rains) to ensure that the garbage and silt from the top is removed.

iii. Water recharge efficacy

These are percolation wells and not storage wells. Which means that these wells are built so as to enable good water percolation and recharge of the underground aquifers. In case the well is still holding water long after the monsoons, it is quite likely because the percolation well is located in an impervious rock zone. We found that nearly 36% of the percolation wells still had water in them in December. The water column in these wells stood at an average of 3 feet.

H. Inlet cleaning work

There are three major inlet channels which bring the runoff from the watershed into the lake. These had become obstructed with wild growth of plants and other waste material. The lake rejuvenation work had been completed in the year 2020-21, resulting in the lake filling up fully after several years.

The cleaning work of the inlet channels was taken up (and completed) in the following year, that is, in 2021-22. When the assessment team inspected the inlet channels in December 2023, these were found to be again overgrown with lantana and other such plants. The upkeep and maintenance of the inlet channels was the responsibility of the Panchayat. On asking the Panchayat leaders about the same, they cited lack of funds.

Given that the lake had filled up in 2021, before the channel cleaning work was undertaken, suggests that overgrown inlet channels may not come in the way of the lake filling up in future also. However, well-maintained and clean channels will certainly mean improved water flow and cleaner water flow into the lake.

I. General awareness among the community about project initiatives taken up in Nandi Panchayat

i. Awareness among beneficiaries of RWH intervention

We had surveyed 180 beneficiaries of RHW systems. 57% of our respondents were women and 43% were men. Following was the awareness level among them about the other initiatives carried out as part of this project:

Table 14: Awareness of project interventions among RWH beneficiaries

Arewness %	Bairanayakanahalli	Madakuhosahalli	Nandi	Singadikadirenahalli	Sulthanpet	Total
Nandi Lake Rejuvenation	75	36	27	77	52	**45**
Percolation Wells	56	0	12	62	22	**23**
Kalyani Tank Renovation	13	46	30	8	30	**28**
Gunduthopu renovation	13	9	18	8	24	**18**

On the whole one can say that a large number (45%) of beneficiaries of the RWH scheme are aware of the work done on Nandi Lake Rejuvenation. 28% of the respondents were aware about the work done at Kalyani and 23% knew about the percolation wells. Awareness about the work at Gunduthopu was the lowest with only 18% of the respondents speaking about it.

ii. Awareness among beneficiaries of farm ponds

There were 48 farm pond beneficiaries, of which 36 consented to take part in the survey. 89% of these respondents were men, and only 11% were women. This is because bulk of these interviews happened at the site of the farm pond, and it was more likely to find the male member of the household there.

Table 15: Awareness of project interventions among farm pond beneficiaries

Awareness %	Bairanayakanahalli	Madakuhosahalli	Nandi	Singadikadirenahalli	Sulthanpet	Total
Nandi Lake Rejuvenation	75	50	89	20	80	**72**
Percolation Wells	75	25	56	0	60	**47**
Kalyani Tank Renovation	25	75	83	40	60	**67**
Gunduthopu renovation	25	25	50	20	80	**44**

Awareness levels about the various project interventions were much higher among the farm beneficiaries than among the RWH beneficiaries. This could be because 89% of farm pond respondents were men, whereas in case of RWH respondents, 57% were women. Men are often more likely to have heard of and seen development interventions happening in the village and therefore awareness levels here are a bit higher. However, even among this category, the best known interventions are the Nandi lake and Kalyani.

iii. Awareness among non-beneficiaries in Nandi Panchayat

Finally, we also interviewed 35 households which were not beneficiaries of any of the individual benefit initiatives such as the RWH system or the farm pond. 40% of these respondents were women and 60% were men. Following table summarizes their responses regarding awareness of project interventions:

Table 16: Awareness of project interventions among non-beneficiaries in villages

Awareness (No. of HHs)	Bairanayakanahalli	Madakuhosahalli	Nandi	Singadikadirenahalli	Sulthanpet	Total
Households interviewed in each village	5	5	10	5	10	35
Heard of RWH	1	0	3	0	3	7
Heard of farm ponds	1	0	3	0	2	6
Heard of Nandi Lake Rejuvenation	2	0	6	4	5	17
Heard of Percolation Wells	1	0	1	2	2	6
Heard of Kalyani Tank Renovation	1	2	1	2	5	11
Heard of Gunduthopu renovation	0	0	1	2	4	7

As can be seen from these tables, even among the non-beneficiary families, recall of Nandi lake rejuvenation and Kalyani is among the highest, followed by the Gunduthopu.

5. Impact Analysis using the OECD Framework

The impact assessment framework used for this assessment was the one developed by the OECD DAC Network on Development Evaluation. The framework uses six evaluation criteria to determine the merit of an intervention –

1. **Relevance:** Is the intervention doing the right things? The extent to which the intervention objectives and design respond to beneficiaries needs policies and priorities and continue to do so if circumstances change.

2. **Coherence:** How well does the intervention fit? The compatibility of the intervention with other interventions in a country, sector or institution.

3. **Effectiveness:** Is the intervention achieving its objectives? The extent to which the intervention achieved, or is expected to achieve its objectives and its results, including any differential results across groups.

4. **Efficiency:** How well are resources being used? The extent to which the intervention delivers, or is likely to deliver results in an economic and timely way?

5. **Impact:** What difference does the intervention make? The extent to which the intervention has generated or is expected to generate significant positive or negative, intended or unintended, higher level effects.

6. **Sustainability:** Will the benefits last? The extent to which the net benefits of the intervention continue, or are likely to continue?

OECD also lists two principles which should inform the use of this framework. These principles are[7] –

Principal One: The above criteria should be applied thoughtfully to support high quality, useful evaluation. These should be contextualized – understood in the context of the individual evaluation, the intervention being evaluated, and the stakeholders involved. The evaluation questions, should inform how the criteria are specifically interpreted and analyzed.

Principal Two: The use of the criteria depends on the purpose of the evaluation. The criteria should not be applied mechanistically. More or less time and resources may be devoted to the evaluative analysis for each criterion depending on the evaluation purpose. Data availability, resource constraints, timing, and methodological considerations may also influence how (and whether) a particular criterion is covered.

In this section, we will present the findings on each of the six parameters, keeping in mind the two principles.

[7] https://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm

Figure 8: Impact analysis using OECD framework

PARAMETER	ASSESSMENT FINDINGS
Relevance	• Overall, it can be concluded that the project and its various constituent interventions rate quite high on the relevance parameter. Chikkaballapur District is categorized as a semi-arid and drought prone district, with an average of 560 mm of erratic rainfall. • 28% of the project funds were spent on reviving the Nandi lake. This single intervention has led to greater rainwater storage and subsequent recharge of groundwater reservoirs which brought alive several tube wells that had become dry. This intervention is most relevant for a region like Chikkaballapur, and for communities, majority of whom are still agriculturists. • The other two interventions (roof top rainwater harvesting and farm ponds) which accounted for about 43% of the total project expenditure have turned out to be much preferred by the community, though for a purpose different from the one the project had envisaged. While the project designed them to serve as decentralized, household and farm level, rainwater harvesting interventions, the beneficiaries have liked them for the water storage facility they created. • The previous point is borne out by the fact that while in 90% of the cases, the water tank made as part of the rooftop rainwater harvesting intervention is being used, only about 17% of the total RWH systems are fully functional and operating as per original intent and design (meaning a water tank which has the water pipe connected to the roof and to the tank, a functional filter and a functional hand pump). • The situation in case of farm ponds is that nearly 70% of the farm ponds were still being used to store water, though less than 25% of farm ponds have an inlet for taking in rain water – farmers are using their own tube well water for filling the tank. • To conclude, one can say that in terms of Relevance, the project is contextually very well-suited, though for some elements of the intervention, there is a difference between the project plan and how the beneficiaries are choosing to use the project assets.
Coherence	• Compatibility refers to how well does the intervention integrates with other interventions in a given region. • The key project intervention, specially the major one of Nandi lake rejuvenation, coheres well with what has been done in the region, either by communities themselves or by others like government, non-profits and other corporates. • In case of some of the other interventions, such as the RWH system and the farm ponds, parts of it (the water storage tank) have good coherence, but the part about considering these tanks as rainwater harvesting does not have high coherence with community.

	• Overall, we can say that the project coherence with the region is fairly high.

Effectiveness	• Effectiveness refers to the extent to which the intervention achieved, or is expected to achieve, its objectives including any differential results across groups.
	• The original project objectives were –
	  ○ Restoration of quality of water in the lake; free from garbage, effluents and other pollutants
	  ○ Revival of eco-system in and around the lake by creating micro climate for aquatic flora and fauna
	  ○ To bring about community ownership through active volunteerism
	• The project has been effective in the work done on the enhancement of the lake's water holding capacity, leading to better groundwater recharge and water in erstwhile defunct tube-wells. However, the continuing water leakage from the lake bund is a matter of concern.
	• The project has not been as effective in terms of ensuring pollutant free water or the revival of the eco-system around the lake, and the public places like Gunduthopu and Kalyani.
	• On the score of community and Panchayat ownership, the project does not fare very well.

Efficiency	• This parameter refers to the extent to which the intervention delivers, or is likely to deliver results in an economic and timely way. • The project managed to restore the Nandi lake and the water body again came alive. That has indeed been carried out well. However, the Panchayat has not kept up the subsequent maintenance work from its end, and the inlet channels and lake bund are in need of repair and cleaning. • Among the other interventions like Kalyani and Gunduthopu, the lack of follow-up and maintenance on the part of the Panchayat is again a concern. • The RWH systems are still very much in demand in the community and almost all the storage tanks are in use. In case of farm ponds, though, the usage of the asset is a bit less (only 69% are currently in use). • The concern in case of farm ponds and RWH systems is that a better understanding of the community priority (of needing water storage structures) may have reduced the expenditure incurred on pipes, filters etc for rain water harvesting, since these were not the need of the community. • However, overall, the project interventions on the lake rejuvenation, RWH systems and farm ponds have delivered very good results for the community.
Impact	• Impact of a project is to do with the difference that it makes – that is, the extent to which the intervention has generated or is expected to generate significant positive or negative, intended or unintended, higher level effects. • The project has generated significant positive returns for the community, in terms of improved water table downstream of the lake, creation of water holding infrastructure at household and farm level, and reduction in drudgery and uncertainty.

	• The most significant positive impact of the project has been in terms of the increased water table in the downstream of the Nandi lake. This in turn has revived several tube wells which had gone dry. • Another very positive impact has been the improved water availability at household level. The RWH systems include a water storage tank which is by and large in use in every household. Nandi Panchayat has now provided water connections in almost every household, though the water supply in the taps is limited to a couple of hours on alternate days. In this scenario, the tank is very useful, and has made life much easier for the women since water can be easily stored for 2-3 days. In fact, the RWH tank is the one intervention for which we kept hearing further demand from families.
Sustainability	• Sustainability is among the most critical of all parameters and addresses the fundamental question of whether and to what extent are the benefits likely to continue. • Given the poor maintenance of all community level investments, the sustainability of the community assets (Nandi lake, Gunduthopu, Kalyani, percolation wells) – and therefore the durability of impact – is a matter of concern. • A key sustainability strategy of the project was that the Panchayat will look after the regular repair and maintenance of all the public interventions (Nandi lake, inlet channels, Kalyani, Gunduthopu, plantations) and individual owners will look after the individual assets (RWH systems, farm ponds, school RWH system). Towards this end, there was a proper written agreement done with the Panchayat. • Further, a Lake Committee had been formed to ensure that the community will stay engaged and involved. • However, the Panchayat has taken no responsibility for the upkeep of any of these interventions. The Lake Committee has not met after the construction work was completed. And from the few conversations with members of the Lake Committee, they are unclear about what role they could have played subsequent to project completion. • At the household level, in case of the RWH systems, the water storage tanks are by and large well-maintained and most families have developed their protocols for doing the same. The encouraging thing is that most of this new workload has not been left to the women alone, but is shared by all family members.

6. Volumetric Water Benefit Accounting

The Volumetric Water Benefit Accounting that has been done for the project follows internationally laid down protocols. We reviewed the calculations taking into account the supply side availability, the design potential and actual field conditions. We developed an easy-to-use excel template for these calculations. This was done by eKO Knowledge.net (a scientific/technological start up in Environment, Sustainability and Water Resources Management) and Dr MVRL Murthy, an experienced veteran in wide ranging areas of Environment, Sustainability and Water Resources Management.

According to calculations made, the volumetric water benefit (VWB) amounts to 2,58,777 cubic meters for a full year. The detailed excel is attached with the report at Annexure 1.

The above calculations for this project have factored in the actual status found on the ground. These are as follows –

Table 17: Volumetric Water Benefit calculations

S No	Intervention	Actual status as found	Impact on VWB calculation
1	Nandi Lake	Some of the replenish benefit is lost due to withdrawal of water from the downstream tube wells. The same has been added to the losses from evaporation.	In case water is being simultaneously withdrawn through canals or tube wells, the same is not available for replenish, hence deducted.
2	Farm ponds	Total farm ponds as per the Project Completion Report – 50 Total farm ponds located by the survey team – 48 Totally abandoned farm ponds – 15 Hence, farm ponds for which any replenish benefit can be claimed – 33	VWB can be claimed only for 33 farm ponds
3	RWH systems	Total RWH systems as per the Project Completion report – 262 Total RWH systems located by the survey team – 245 Totally abandoned RWH systems – 25 RWH systems with pipe connected to the roof for rainwater collection – 82	VWB can be claimed only for 82 RWH systems

4	Percolation wells	Total percolation wells as per the Project Completion Report – 90 Total percolation wells located by the survey team – 81	VWB can be claimed only for 81 percolation wells. However, even among these 81 percolation wells, 29 wells still had water standing in them in December – which puts a question mark on how well are they meeting the recharge expectation.

7. Recommendations

On the whole, the project has done well in achieving its primary objective of rejuvenating an important water body for the community. Having a full lake has not only improved the ground water situation in the area, but the range of initiatives taken up as part of this project have touched the lives of a large section of the Panchayat.

The project had a good mix of public and private benefit activities and thus touched most stakeholders – school children, housewives, farmers and the general public.

An important challenge that the project faced was the onset of pandemic, and it is creditable that the project managed to conclude all activities despite the completely unforeseen disruption caused due to Covid.

This section contains some suggestions which could help in improving the efficacy, efficiency, impact and durability of similar interventions in future.

7.1 Planning Process

The planning and design stages of any project lay the foundation for quality and durable implementation. This is also the stage when mechanisms of people's participation can be thought of and integrated.

The planning stage is also when alignment between community needs and project objectives can be ensured. A Participatory Rural Appraisal at this stage can also help in better targeting and distribution of project benefits. For example, in this project, the distribution of some of the individual benefit items like the farm ponds and RWH systems across different socio-economic categories has been fair in terms of being proportionate to share in total population. However, adding a dimension of need (along with feasibility), may be a useful criterion for future interventions where individual beneficiaries have to be selected.

Further, and again taking the example of the farm ponds and the RWH systems, a better needs assessment at this stage would have revealed that the beneficiary families needed underground water storage tanks. They did not see the value of the rain-water harvesting elements of this intervention – the pipes, filter, etc. For some reason, even the hand-pump for water withdrawal did not work as well, since the effort involved in putting in a bucket and pulling out the water directly was much less than working the hand pump. A better needs assessment as well as an understanding of community practices may have further improved project efficiencies.

7.2 Implementation

For most of the project interventions, a very high quality of implementation has been maintained – specially in case of percolation wells and RWH systems.

However, greater care was needed in the lake bund repairs that were carried out. The bund is still leaking and maybe greater attention should have been paid to the quality aspects of the repair or maybe a more thorough assessment of the underlying reasons for the seepage should have been undertaken.

Similarly, greater care could have been paid to the plantation part of the project. The survival percentage of the saplings that were planted appears to be low. A more precise count could not be done since there was no marking done to set out the new plantation. The survival may be poor due to inadequate post plantation care (watering, weeding, etc) or it could have been due to browsing by animals. No tree guards or fencing system seemed to have been put in place, which would have served the dual purpose of protection and identification.

The choice of species which were planted could also be looked into. Ornamental plants cannot be considered as part of an eco-restoration effort. These will also not help in accruing any long term carbon credits.

7.3 Documentation

While the implementation has been fairly good, good documentation has been a challenge in this project. This was both in terms of correct lists of beneficiaries and intervention locations, whether private or public.

Good documentation is important from a post project assessment perspective, and even for the project's own concurrent monitoring, reliable data is required. Concurrent monitoring is useful not only to track the physical progress, but also for aligning the financial outlays and expenditures with actual work done on the ground.

Given the advances in technology, it is in fact now easy to even geo-tag locations and have precise location mapping of where the initiative is located. This is not expensive and would be a very useful addition to the documentation protocols.

Good documentation and data is also key to tracking and claiming impact at a later stage. For instance, in case of this project, a proper documentation of tube-wells' status before the lake rejuvenation would help in tracking improvements in the same after the project was complete. This kind of before-after data helps hugely in understanding year-on-year impact – both impact that may have been anticipated and at times, even in understanding any unintended impacts.

7.4 People's participation

People's participation and involvement in development projects is considered an essential ingredient for the success of most interventions in the social sector. This is not only because any hardware that is created will need to be looked after, but also because the durability of many such initiatives rests on an accompanying change in behaviour.

It begins with the planning process itself, where the identified initiatives must connect with the priorities of the beneficiaries. Further, and specially in case of public goods (like Gunduthopu or Kalyani or the Nandi lake) it is important to understand if people have conflicting claims on the same. These should be recognized and resolved before the project starts.

Formation of community committees is also a good pathway to gaining greater people's participation. Care has to be taken to ensure that such committees are representative of different segments in the village. For instance, the Lake Committee that was formed in

this project had no women and most of the men were drawn from one demographic profile.

Another surrogate indicator that is often used to build and gauge people's participation is fixing contribution norms for the community. In this project, there was some contribution requirement in case of RWH systems (digging of the underground tank had to be done by the family), but not so in case of the farm ponds. Given that the Farm Ponds and RWH systems are valuable assets (from a household's perspective), asking the families to contribute a small amount would have enhanced their stake, reduced wastage and even improved the project's documentation.

Even in case of public interventions, it is possible to build in a component of participation and it may be good to consider it for future interventions.

7.5 Sustainability

The sustainability of the community assets (Nandi lake, Gunduthopu and Kalyani) – where significant project investments have been made – is an important expectation. When the project exited the region, it hoped that the Panchayat will take care of the ongoing maintenance requirements. However, it is unfortunate to see that the Panchayat has not stepped up to take care of these initiatives, as a result of which, the original work is already getting undone.

The other institution that was expected to look after these assets was the Lake Committee. However, this Committee has not met after the project implementation phase. There seemed to have been no clear protocols put into place as to how the Committee would function once the UWB team exited, and what would be the Lake Committee's role vis-à-vis the Panchayat. Putting in place some mechanisms like that, and having a handholding period after the physical project work was over, would have definitely helped.

And finally, since the implementing partner had no long term base or continuity in the area, they too left once the project was completed. As a result, none of the three sets of stakeholders – the administrative body (Panchayat), the local community (Lake Committee), the implementing agency – provided any continued involvement or ownership on the assets that had been created.

In future, the following could be explored to ensure better post-project care:

- Include a small sustainability component in future projects – to ensure basic oversight and provide a critical repair component. This sustainability component would ensure that the implementing partner stays on to look after the project for at least two to three years.
- During the post project period, the implementing partner should continue to work with community institutions and Panchayats so that they gradually understand and accept their responsibilities towards these projects.

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