



Apollo Tyres Foundation

IMPACT EVALUATION OF REJUVENATED
PONDS IN SENNAKKUPPAM AND
ERAIYUR VILLAGES

Karvy Insights Limited



1.0 Introduction

1.1 Background

India is facing a serious water crisis – its rivers and water bodies are drying up, its dependence on ground water has reached unsustainable levels, and a large number of Indians have no access to safe drinking water. One cause of the current crisis is the deterioration of the country's water bodies. The water bodies of India are the source of water security in the villages and were instrumental in recharging of groundwater in the area. Years of neglect and encroachment have resulted in their deterioration, leading to acute water shortage. There has been a rapid depletion of ground water, resulting in a shortage of water for drinking and agricultural activities. Safe drinking water remains inaccessible for more than 80 percent of India's rural population despite determined efforts by public, private, and non-profit organizations to meet this need in rural communities. The priority of the government is wider piped water access. Multilateral organizations provide support through reform initiatives in the areas of institutional capacity building, social education, and developing public-private partnership models. Social entrepreneurs have adopted varying approaches to treatment, distribution, financing, and community engagement. Although these approaches have significant potential, there has been little cohesion among them, making it challenging to achieve the degree of coordination required to deploy them effectively at scale.

Sustaining the environment is an important focus area of Apollo. The major aim of this initiative is to raise people's awareness and provide a better environment to our stakeholders and communities surrounding our manufacturing locations. This is why at Apollo various projects have been undertaken to combat several environmental problems. One such interventions of note is the **Eco restoration and improvement of water bodies**. These projects are designed for improving water bodies with focus on restoring and enhancing the aqua-biodiversity. Pond restoration projects have been undertaken since 2015 in and around Oragadam through Apollo Tyres CSR. A detailed study for 21 ponds in Mathur & Sennakuppam panchayath, Kancheepuram District was conducted and 4 ponds have been renovated as on date, 3 ponds have been partially renovated.

Against a RFP floated by Apollo Tyres Foundation, Karvy Insights Limited has conducted an impact assessment of this CSR initiative. The coverage was three ponds, viz. Nalla Thani Kulam and Sennan Thangal ponds in Sennakkuppam village and Gangai Amman Koil Kulam in Eraiyur village. and This report details out the findings from this exercise.

1.2 Research Objectives

1. Capture community perception regarding the intervention and the observed differences pre and post intervention
2. Assess the impact of the interventions on their lives and environment
3. Measure impact of the rejuvenation of ponds on ground water table as well as availability of a conducive environment for health and recreation
4. Prepare a set of recommendations highlighting replication and intensified impact

1.3 Research Design

1.3.1 Data collection methods

We adopted a mix method approach for this research assignment. This included the following:

QUANTITATIVE	
Elderly residents (aged 60 +)	Questionnaire survey
Middle aged (aged 30-50)	Questionnaire survey
Adolescents (aged 15-25)	Questionnaire survey
QUALITATIVE	
Housewives	Focus groups
Community decision makers	In-depth interviews

1.3.2 Sampling framework

Given that the geographical area of investigation is fairly limited and the sampling universe is also small, we used the modified Cochran formula for small sample sizes to arrive at a potential sample size, as follows:

$$n_0 = \frac{Z^2 p(1-p)}{e^2}$$

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

Where:

- e is the desired level of precision (i.e. the margin of error), taken at 6%
- p is the (estimated) proportion of the population which has the attribute in question, taken at 50% or 0.5
- q is $1 - p$.
- Z^2 is the square of the Z value at 95% level of confidence, i.e. 1.96
- N is the population size

Given that n_0 works out to be 263 and N is $550 \times 3 = 1650$ households (total households of the two panchayats of Sennakuppam and Eraiyur, The value of 'n' works out to be 227 household.

These households were distributed across the three panchayats on a pro rata basis of their actual population. Within each panchayat, households were selected using a circular systematic random sampling procedure after identifying a random starting point and determination of an appropriate sampling interval. We then followed the right hand rule. By following a circular SRS procedure, we ensured that sample is drawn from the entire village and not just any single Mohalla. It may be noted that all three panchayats are located in the Sriperumbudur block of Kancheepuram district.

We also undertook 2 FGDs, one in each village, covering 8 housewives in Eraiyur and 5 housewives in Sennakkuppam; and also conducted two key informant interviews, one with Ms. Sasirekha Sarvanan, current village president of Eraiyur and one with ex-panchayath president of Eraiyur, Mr. Munnusamy.

1.4 Project Execution

1.4.1 Estimation of field manpower

For the quantitative survey, we deployed one team. The team comprised of 4 enumerators and 1 supervisor. The four enumerators covered 28 households in one day, thus completing the 227 households in 9 days plus 2 days for to and fro travel from District HQ.

We also engaged a qualitative moderator (fully conversant in Tamil and with experience in undertaking moderation work for social research projects) who will conduct the 2 FGDs and 2 IDIs.

1.4.2 Training

The training for this study took place in Chennai. The participants included 4 enumerators, 1 supervisor, the field executive from Karvy who is in charge of Tamil Nadu, the moderator, and one research personnel responsible for imparting the training. The duration of the training was for two days, one day of classroom training using pen and paper and one day of mock trials using tablets embedded with the questionnaires in soft form (CAPI).

1.4.3 Tools for data collection

Quantitative data capture format was scripted in CAPI for administration electronically. To ensure we do not face any glitches and time loss at the beginning of the survey due to sub-optimal functioning of the back-end software, we did not commence with fieldwork without having a trial run of the Apps. We undertook a dummy fieldwork where App was tested along with the practice of Assessors and their monitors. Trial run happened on the last day of the training of assessors as a field practice of assessors and these assessors were monitored by their respective monitors. This exercise gave us clear idea of the functional status of the App as well as provide clear understanding of the work to field assessors and in house monitors.

1.4.4 Analysis

All the quantitative analysis for this project was done using SPSS. However, the submission of the raw (validated and cleaned) data will be done in whatever format is preferred by the client. The syntaxes used for the analysis is also be the client's property and will be handed over along with the final submission. All transcripts and content analysis sheets will be handed over to the client as well upon the completion of the project.

2.0 Profile of the sample

2.1 Profile of the study area

Sennakkuppam and Eraiyur are not a typical villages. It is right in the middle of an industrial area located just 8-10 km from Sriperumbudur city. There are many industries here, including Nokia, and ancillary parts manufacturing plant for Samsung, Ford, Daimler, Apollo Tyres, etc. Within the village, there was very limited farming activities going on as most land have been sold to industries. Villagers here either work as salaried personnel in the surrounding industrial area or earn through renting out part of their homes to employees of industries, who are mostly from out of state. Villagers even construct accommodations in their barren land to give out on rent, and this is a major source of earning.

2.2 Profile of respondents

2.2.1 Distribution by gender

A total of 227 individuals participated in the survey. Their distribution was 159 from Sennakkuppam village (where two ponds were selected) and 79 from Eraiyur village. Households were selected from among residential locations in proximity to each pond (sample ranging between 73 and 78 respondents). Overall, 71.4% of the respondents were male while 28.6% were female.

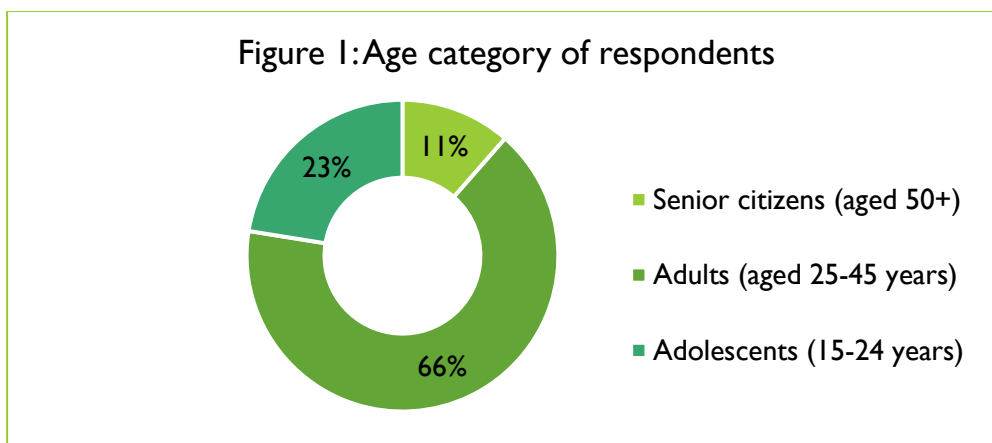
Table 1: Distribution of sample by gender

	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam		TOTAL	
	N	%	N	%	N	%	N	%
Male	58	79.5	52	66.7	52	68.4	162	71.4
Female	15	20.5	26	33.3	24	31.6	65	28.6
Total	73	100.0	78	100.0	76	100.0	227	100.0

On an average, the respondents were a resident of their respective village for 30 years. This was similar across both villages and for all three ponds.

2.2.2 Distribution by age categories

The overall sample was further sub-divided into three respondent segments, viz. senior citizens (50+ years), adults (25-45 years) and adolescents (15-24 years). This was purposively done to ensure that that we elicit opinions from different age groups.



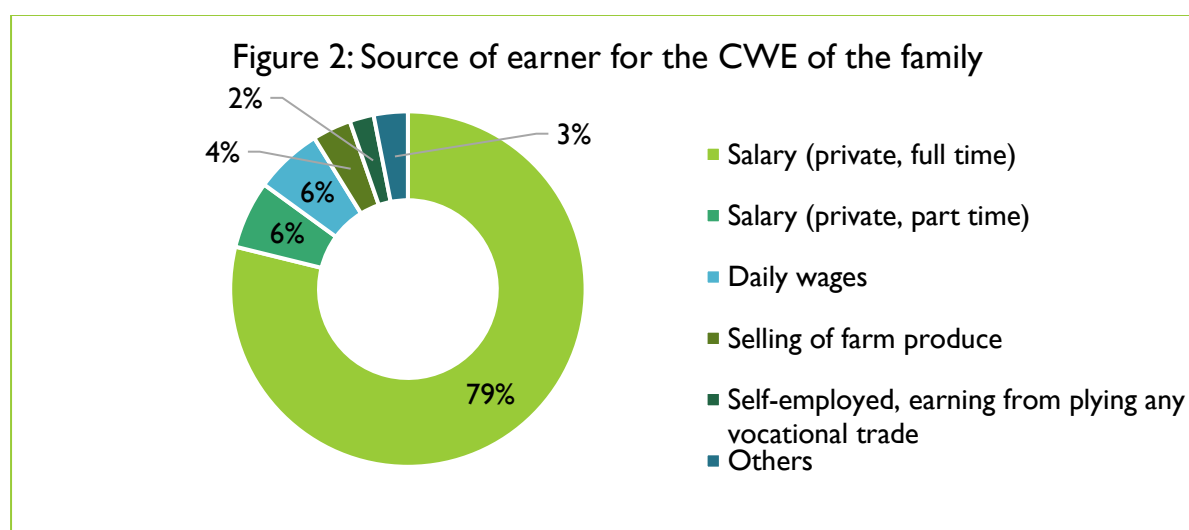
Overall, two out of three respondents were in the adult category while 23% were adolescents and one out of 10 were senior citizens. The trend was somewhat similar across all three ponds.

Table 2: Category of respondents

	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Senior citizens (aged 50+)	9	12.3	5	6.4	12	15.8
Adults (aged 25-45 years)	47	64.4	53	67.9	50	65.8
Adolescents (15-24 years)	17	23.3	20	25.6	14	18.4
Total	73	100.0	78	100.0	76	100.0

2.2.3 Distribution by source of income

As mentioned earlier, the two villages are not typical of rural India in the sense that there is hardly any agriculture activities going on there, because they are within an industrial park which is part of the Oragadam Industrial Corridor. Close to 80% of the respondents belonged to households where the primary source of income is salaried income from full and part time employment in the private sector. Only 6% of the households earned through wage labour and a further 4% from selling if farm produce.



The distribution across the households within proximity to the three ponds was fairly similar.

Table 3: Principal source of income for chief wage earner of household

	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Salary (private, full time)	65	89.0	53	67.9	61	80.3
Salary (private, part time)	3	4.1	9	11.5	2	2.6
Daily wages	5	6.8	7	9.0	2	2.6
Selling of farm produce	0	.0	0	.0	8	10.5
Self-employed, earning from plying any vocational trade	0	.0	3	3.8	2	2.6
Others	0	0	5	6.4	1	1.3

3.0 Pre-rejuvenation stage

3.1 Historical importance of this pond for the people of this village

Historically, the water from the ponds was used for religious purposes. This was confirmed by over 90% of the survey participants. Close to half the participants also said that villagers used to bathe in the ponds, as well as it being a natural protection against floods (42%). Around a third of the respondents had said the ponds facilitated the recharging of wells. Fishing and irrigation usage was village specific, and that requires a disaggregation of this data by pond.

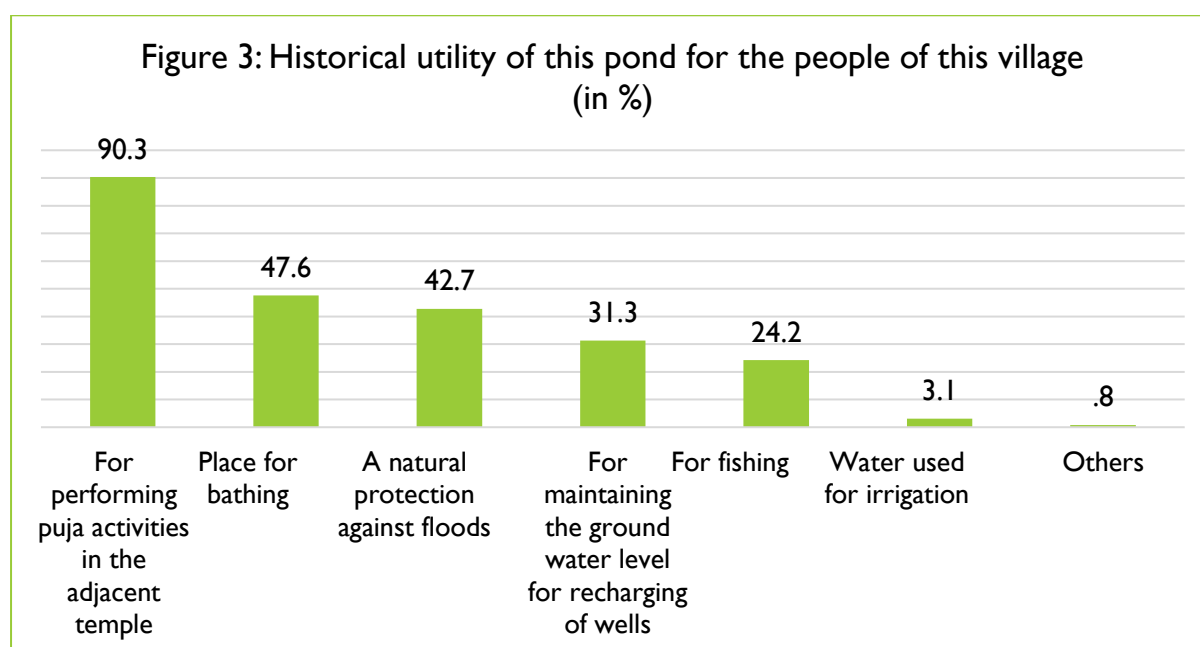


Table 4: Historical utility of the ponds

	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Source of water for drinking	0	.0	1	1.3	0	.0
Place for bathing	27	37.0	75	96.2	6	7.9
For performing puja activities in the adjacent temple	64	87.7	77	98.7	64	84.2
Water used for irrigation	1	1.4	5	6.4	1	1.3
For maintaining the ground water level for recharging of wells	14	19.2	46	59.0	11	14.5
For fishing	18	24.7	9	11.5	28	36.8
A natural protection against floods	30	41.1	40	51.3	27	35.5
Washing clothes and bathing	10	13.7	16	20.5	19	25.0
Total	73	100.0	78	100.0	76	100.0

It may be noted that the pond water (all three ponds) was used for drinking and washing clothes. Fishing was practiced primarily in the Gangai Amman Koil Kulam pond. The pond water was rarely used directly for irrigation. Regarding protection against flood waters, this was primarily mentioned by the survey participants from Sennan Thangal pond.

Interestingly, while 61% of the respondents (overall) had reported that in more recent times the dependency on these ponds in their lives have remained the same as before, around one in five did say their dependency had come down over the years. The principal reason why this was so had been stated as deterioration of water quality (for 100%) and advent of piped water supply to doorstep (for 40%).

According to Munnusami, the erstwhile panchayat president, there was no bore and since, people didn't have money, they used to drink and use water from the pond and tanks only for washing clothes and utensils as well as bathing. But this was a long time ago and much before piped water came into the village.

The focus group discussions also provided interesting insights into the historical importance of these ponds. The participants had confirmed that the villagers used the pond water for everything. They used to fetch water from pond and use it to wash clothes, utensils, for cooking, bathing, drinking. But all of this happened at a time there was no tap water. In addition to personal use, the pond water also used to be used for irrigation, as well as for bathing cattle and goats.

It was further confirmed that in Sennakkuppam, the panchayat used to appoint a person to guard the pond water in order to prevent people from washing clothes. When the water was clean, the Nalla Thani Kulam pond was used for fulfilling a local custom.

“Earlier when babies were born they used to bathe them first in the pond water only and also give that water for the baby to drink because it will make the babies strong and give immunity, the water was so good. 30-40 years ago, babies were given a bath with this water because the banyan tree is there, and there is a neem tree around here as well. The roots of the banyan tree touch the water and the neem leaves fall in the water, so the water used to be considered very good for the babies” Sasirekha Sarvanan, President, Eraiyur

3.2 Condition of the ponds just prior to rejuvenation

As a top of the mind recall, the majority of the survey participants pointed out the following ills that had become of their pond in more recent times:

- Water quality had deteriorated because of sewage and drainage filling (95.6%)
- Quality of water in terms of its smell and look had declined considerably due to pollutants and algae (75.8%)
- Encroachment from the sides reduced catchment water holding capacity (70.9%)
- Water surface covered with water hyacinth so people could not bathe (68.3)
- Storage capacity had decreased owing to dumping of sewage and encroachment (52.9%)
- Ground water recharge had declined and well-water had sunk (52.0%)
- Water had become unusable for temple use and for festivals (43.6%)

The villagers at Eraiyrur blamed the deteriorated condition of the pond completely on the in-migrants who have come to live in their village on rent.

“The Hindi speaking people have started washing clothes, washing cattle, washing the utensils there itself. So the water has got polluted. Lot of plastic wastage is there in that water so nobody uses it now” FGD with adult females, Eraiyrur

“They throw waste, bathing cattle, throwing liquor bottles in the pond, doing lot of unnecessary things. Actually there was no water in the pond, it was filled with waste material, wastage, plastic covers, bottles, waste clothes. It is mainly because of negligence that this has happened.” FGD with adult females, Eraiyrur

Sasikala Sarvana and Munnusamy, current and past president of Eraiyrur shares the same sentiment.

“Earlier the taste of the water used to be very good, but now, because population has increased, people from other states have started living here and they have no respect for the local pond. We are not using pond water now, at present we are using bore water”..... Munnusamy, ex-president, Eraiyrur

She also mentioned that some 20 years before, every house had cattle and goats and people and cattle used to take bath in the pond water. But from when companies came, their industrial waste is contaminating this water and people have started saying their skin feels itchy if they take a bath in the pond water.

She further added that since all the dirty water used to get collected in the pond, the moss, weeds, etc. started getting formed and this led to a bad smell. Earlier, people used to fish in the Eraiyrur pond and share the catch with neighbours. With the increase in population, the canal which collects all dirty water leads to the pond and so it has become very contaminated. So nobody used this for drinking. They used dump the waste and cattle dung there and in the night, people used it as open toilet.

At Eraiyrur, the FGD participants also confirmed that the sewage water and canal water got mixed in the pond.

Perception of deteriorating condition of the ponds and its impact on their utility for individual homes varied across ponds, as has been depicted in the following table.

Table 5: Condition of the ponds just prior to rejuvenation

	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Storage capacity had decreased owing to dumping of sewage and encroachment	35	47.9	54	69.2	31	40.8
Water quality had deteriorated because of sewage and drainage filling	68	93.2	75	96.2	74	97.4
Ground water recharge had declined and well-water had sunk	46	63.0	34	43.6	38	50.0
Quality of water in terms of its smell and look had declined considerably due to pollutants and algae	62	84.9	50	64.1	60	78.9
Encroachment from the sides reduced catchment water holding capacity	53	72.6	48	61.5	60	78.9
Water surface covered with water hyacinth so people could not bathe	55	75.3	41	52.6	59	77.6
Waste being dumped in the pond from households and construction	23	31.5	27	34.6	7	9.2
Bund has been broken due to encroachment	5	6.8	27	34.6	3	3.9
No protection against floods which happen frequently	4	5.5	36	46.2	1	1.3
No fishing possible	7	9.6	4	5.1	9	11.8
Contamination of ground water	8	11.0	22	28.2	9	11.8
Water had become unusable for temple use and for festivals	16	21.9	70	89.7	13	17.1
Waste water from nearby homes and village sewage lines dumped into the pond	9	12.3	52	66.7	3	3.9
Total	73	100.0	78	100.0	76	100.0

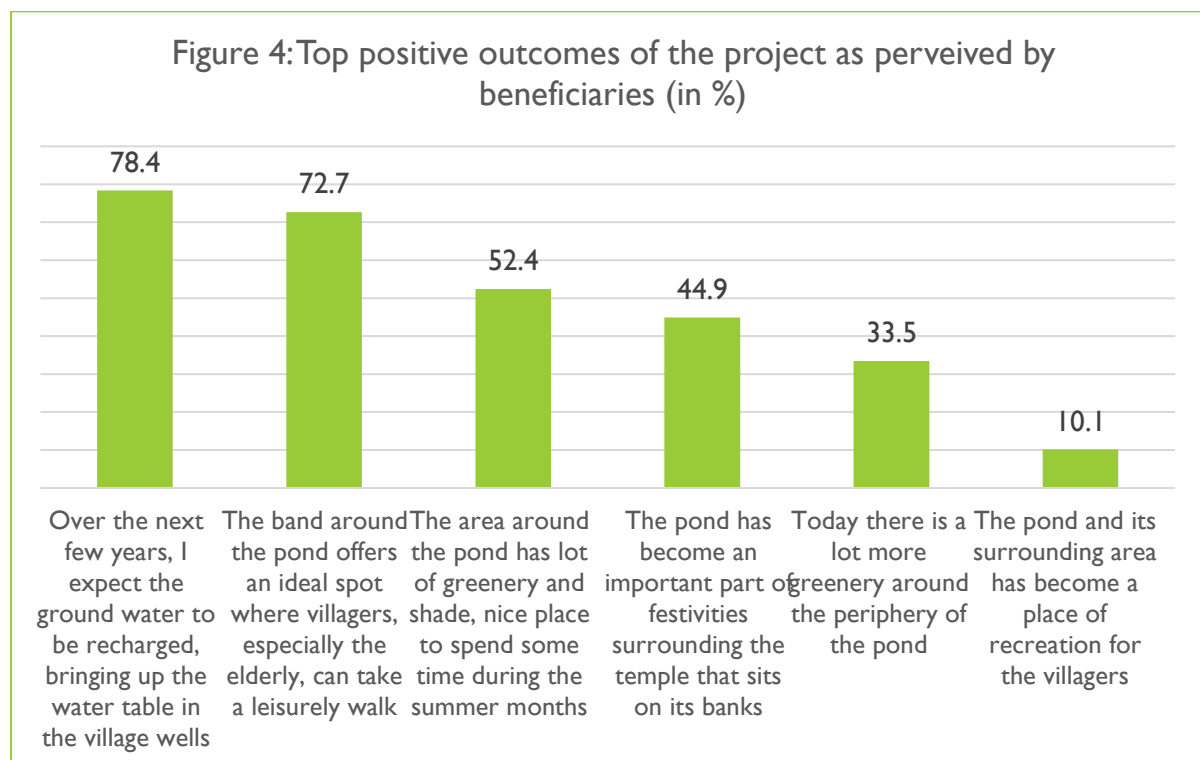
In short, the above discourse clearly justifies the need for such an intervention undertaken by Apollo Tyres.

4.0 Post rejuvenation stage

4.1 Top positive outcomes of the project as perceived by beneficiaries

1. The respondents to the survey were asked to mention at the most three positive outcomes of the rejuvenation process. The summarised results have been presented below. Please note that these were not *a priori* constructed responses which were read out to the participants.
2. Close to four out of five survey participants believed that over the next few years, they expect the ground water to be recharged, bringing up the water table in the village wells ;

3. Close to three out of four survey participants believed that the pathway around their pond offer an ideal spot where villagers, especially the elderly, can take a leisurely walk;
4. A little over half the respondents believed that the area around their pond has lot of greenery and shade, nice place to spend some time during the summer months;
5. About 45% of the survey participants believed that their pond has become an important part of festivities surrounding the temple that sits on its banks.



The differences in prioritised responses across ponds have been tabulated below:

Table 6: Positive outcomes of the project as perceived by beneficiaries

	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
The total storage capacity of the tank has increased by quite a bit and there is much more water in the pond than before	0	.0	7	9.0	0	.0
Over the next few years, I expect the ground water to be recharged, bringing up the water table in the village wells	58	79.5	64	82.1	56	73.7
The water has become clean and fit for washing and bathing	8	11.0	0	.0	0	.0
Today there is a lot more greenery around the periphery of the pond	37	50.7	0	.0	39	51.3

	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
The band around the pond offers an ideal spot where villagers, especially the elderly, can take a leisurely walk	53	72.6	54	69.2	58	76.3
The area around the pond has lot of greenery and shade, nice place to spend some time during the summer months	40	54.8	21	26.9	58	76.3
Sewage and drainage water are no longer being emptied in the pond	0	.0	1	1.3	0	.0
The pond has become an important part of festivities surrounding the temple that sits on its banks	20	27.4	69	88.5	13	17.1
The pond and its surrounding area has become a place of recreation for the villagers	2	2.7	18	23.1	3	3.9
Total	73	100.0	78	100.0	76	100.0

Across all three ponds, very few survey participants held on to the opinion that the total storage capacity of the tank has increased by quite a bit and there is much more water in the pond than before. This necessarily does not mean that this has not happened, for deepening of the ponds to hold more water has been done across all three ponds. It is just that respondents were asked to prioritise three top outcomes and this was not one of them. Similarly, very few respondents were of the opinion that the water of their pond has become fit for cleaning and bathing. What is of note is that the fact that sewage and draining water is no longer being drained into their pond is not a priority outcome. Whether this is the case because some sewage water is still draining into the ponds needs further investigation. The qualitative research did reveal that some of the households of in-migrants who are on rent still continue to dump waste in the ponds.

The enhanced stature of their pond leading to it becoming an important part of religious festivities was more for the Sennan Thangal pond than the other two. Similarly, the issue of more greenery around the pond as a priority outcome was mentioned only for Nalla Thani Kulam and Gangai Amman Koil Kulam. This was similar when it came to recognising that the area around the pond has lot of greenery and shade, nice place to spend some time during the summer months. Overwhelmingly, and across all three ponds, the outcomes that were mentioned by the largest proportion of respondents were expectations that the ground water to be recharged, bringing up the water table in the village wells, and the pathway around the pond offers an ideal spot where villagers, especially the elderly, can take a leisurely walk.

In the Gangai Amman Koil Kulam pond, the local villagers could confirm that these days, cattle and goat can drink the water, and they are given bath there as well. In case of urgent need, people also take potful of water. They also confirmed that elders go walking around the pond and they sit there Below the banyan tree. Women also go there for walks, sit for some time, and chat.

Sewage water no longer gets into this pond. People don't dump their waste there anymore.

Since the Nalla Thani Kulam pond has been rejuvenated, only when there is water problem the water from the pond is used.

“There is piped water for all houses and so we are using that for everything. Everybody has a bore well in their houses and there is tap in every street. People are not using the pond water; only if there is no current and there is no water then people might use this water” FGD among adult females, Sennakkuppam

Regarding the Nalla Thani Kulum, there was more to be appreciated, This year there was excess rain, and because there is no other outlet in this village, all the rain water got stored in this pond as it has been dug deeper. The excess rain water made way into the pond so there was no flooding of water in the village.

However, some of the current practices are not conducive to keeping the pond clean. It was confirmed that some villagers are using the water for bathing the e cattle. And when there is heavy rain the water will be very clear, so people wash their clothes there.

The FGD participants at Eraiyur confirmed that ATF has laid a park around the pond and they have made it ready for walking. It is useful for people, for sugar patients for elders to go for walking. Children cycle around it and it’s a play area for the children. The place is very clean.

However, it may be noted that regarding the Sennakkuppam, women don’t use the pond water because even though the water in the pond has been cleaned, on the other side of the pond there are houses on rent and the waste from the kitchen and the waste water from washing clothes gets mixed in this water.

According to the president of Eraiyur, the condition of the pond just before rejuvenation was had become too deteriorated or it to be of any use for the villagers. There was no maintenance of the ponds, because the panchayat is poor. However, she also mentioned that the current finances of Eraiyur permitted them to spend on basic needs like providing water, electricity, etc. There is just no budget for extra facilities like cleaning the ponds, having tower lights, etc.

“Companies like ATF, if they do it is possible.” ... Sasirekha Saravanan, president, Eraiyur

Across both villages, the FGD participants could confirm that because of the ponds, there has been an increase in the ground water, and for houses around the pond, there is more water in their wells.

It was also confirmed that there are some households in the village who, even today, hesitate to use the pond water. This is so because they have seen the pond water in a contaminated state and they feel that water will still be there in the pond. Another reason is we get sufficient water in the tap itself so we are using the tap water.

The water in the Eraiyur pond is used for fishing because the water from the pond is connected to the lake so the fish from the lake come into the pond.

The water from the pond is also used for construction purposes using a motor pump. Water is pumped out for watering the plants as well.

According to the villagers, now the condition of the water is very good because panchayat had cleaned it once or twice.

“My house is near the pond. Earlier during even the slightest rains, water snakes and insects will come out and we will get the bad smell from the pond. Now it is not like that. they have put stones below and built the pond so it is safety for the houses nearby also” FGD among adult females, Eraiur

As one FGD participant in Eraiur puts it – “One can say that the pond was in ICU state and now it has been revived”.

“There were lots of lotus plants, marine plants, it was dirty and smelly. After Apollo came only they cleaned it with the help of JCB Earth Movers. . They lined the sides with stones and made the top with cement block, it is now super” Munnusamy, prior president, Eraiur

“Earlier the depth of the pond was less, so children will hold on to the banyan tree roots and play. but now it is very deep so children do not play“... Sasirekha Saravanan, president, Eraiur

Mr. Munnusamy further reiterates that in the earlier years, since villages are all nearby, all the water from the houses used to get mixed in this pond. Now Apollo drained that water using pipes and pumps. Now the waste water from houses and sewage water is all going out and not getting into the pond. Only rain water gets collected in the pond.

4.2 The current status of operations and maintenance

In this regard, the president of Eraiur was not very liberal with her praise. While she did confirm that the panchayat had made an one-time expenditure of Rs.40,000 to clean the surrounding area of the pond, it would have been better if they (Apollo) had appointed one person to maintain the pond and the area around it, the pond would have been clean and the area around it also would have been clean.

“They have laid a pathway for walking but grass has grown extensively there, if someone was there to clean and maintain it, it will be convenient to walk. Since there are thorns etc. Nobody is going for walk there now”..... Sasirekha Saravanan, president, Eraiur

According to her, if a security was appointed, public will have the trust that the pond will be maintained properly. However, she does agree that the rejuvenation was good.

“There are 13 ponds in our village. They rejuvenated the worst affected pond.”..... Sasirekha Saravanan, president, Eraiur

“We changed the name to "Aala marathu kulam" (Banya Tree pond). Elders had named it as "Pee Kuttai" (Poop Pond) because everybody used to wash themselves in the pond after they used to complete their morning rituals.” Sasirekha Saravanan, president, Eraiur

However, she further observes that local people have stopped using the pond altogether. Even though it has been cleaned now, still they are not using it because only rain water is getting stored in it, there is no inflow or outflow of water. The water is stagnant.

“The water is not fresh. the leaves of the banyan tree fall in the pond, it gets rotten and the water becomes dirty. Maintenance has to be done. It’s been 3 years now” ... Sasirekha Saravanan, president, Eraiyyur

In Sennakkuppam village, the FGD participants could confirm that the pond water is also used for the temple cleaning and doing the *abishek* of the temple idols. But their reporting of the current state of affairs bears resemblance to that of Eraiyyur.

“Elders used to come here for walking in the beginning. but since there is no maintenance, the pathway has become uneven, it has broken; so, if they (Apollo Tyres) appoint some person for maintenance, they are spending so much in rejuvenating the pond, it will be remain in proper condition” ... adult women FGD participants, Sennakkuppam

4.3 Are they aware of the rejuvenation process?

Across both FGDs, it was reiterated by participants that the old water was removed using a pump and all the mud was removed and cleaned and then it was rebuilt using stones. It was dug even deeper.

In both places Apollo has built a compound and pathway around the pond. They planted many plants, herbs, flowering plants. It was confirmed through ATF that there has been focussed efforts and improving bio-diversity surrounding all three ponds. The types of saplings/plants planted include the following varieties:

Table 7: Horticulture initiative around the three ponds

Horticulture - Nalla Thanni Kulam			
Sr. No.	Variety	Spec	Qty in Nos.
<u>PLANTS:</u>			
1	Eranthemum laxiflorum	1 ft	1,400
2	Allamanda catahrtica	1 ft	1,400
3	Durantha repens varigated/ speciosa	1-2 ft	1,400
4	Hibiscus variegated pink/white leaf	1- 1.5 ft	1,400
5	Ixora singaporensis	1.5 - 2 ft	1,050
6	Graphtophyllum	1.5-2 ft	1,800
7	Bougainvilea cherry blossom	2 ft	630
8	Tabaerna montana	1.5 ft	1,400
9	Caesalpinia mix colours	4 ft	420
10	Nerium oleander yellow	4 ft	420
11	Nerium oleander Pink	4 ft	420
12	Aralia variegated	3 ft	1,800
<u>TREES</u>			
1	Sapota	6-10 ft	12
2	Annona squamosa(ceetah fruit)	6-9ft	12
3	Citrus limonia	5-7 ft	12
4	Feronia limonia(wood apple)	5 ft	12
5	Phyllanthus acidus(sirunelli)	5- 7 ft	12
6	Phyllanthus emblica(peru nelli)	5- 7 ft	12
7	Psidium gujava(Native guava)	5-7 ft	12
8	Aegle marmelos(vilvam)	5 ft	12
9	Borassus flabellifer (Panai)	3 ft	12
10	lagerstromia speciosa	6 -9 ft	20

11	Casia fistula	6-9 ft	20
12	Nytanthes arbortrists -pavala malli/lagerstromia thorelli	4-6 ft	20
13	Spathodea campanulata	6-9 ft	20
14	Taebubia rosea	6-9 ft	20
TOTAL			13,748

Horticulture - Sennan Thangal			
Sl. No.	Description	Qty in Nos.	
1	Hemalia patens - 1ft	2,500	
2	Pulmbago capensis - 1ft	2,500	
3	Tabernamentana varigated - 1ft	2,500	
4	Cheeta - 5ft ht	20	
5	Amla -5ft ht	22	
6	Gouva	20	
7	Sapotta	20	
8	Lemon Grass	100	
9	Wadelia	600	
TOTAL			8,282

Horticulture - Eraiyur			
Sl.No.	Description	Qty in Nos.	
1	Hibiscus snow bush	75	
2	Graphtophyllum	700	
3	Alamanda	75	
4	Ixora mini	75	
5	Tabernamantana	75	
TOTAL			1,000

ATF had also put a fencing around the ponds and have laid benches for people to sit. They have put a gate. The villagers have helped in cleaning (one time) and got labour wages. They have not been involved in anything else.

4.4 How invested are the villagers on maintenance of the ponds?

According to FGD participants of Eraiyur, villagers are very interested in maintaining the pond - they want to plant more trees, flowering plants around the pond. They want to be vigilant against dumping of waste. However, they collectively feel it is the panchayats responsibility but they will all help if the panchayat seeks it. According to Munnusamy, ex-president of Eraiyur and the person who was in the helm when Apollo rejuvenated the pond, only ATF rejuvenated this pond while the villagers hardly helped. In fact, unlike out FGD findings, ATF had to bring in labour from outside. He reiterated that he and his team only helped to oversee the work and see that it is being done properly.

In Sennakkuppam, it is different. Here, the villager are already questioning others if they dirty the ponds. People have been appointed to maintain the pond, for its upkeep.. and to ensure that it doesn't relapse to the same sad state. 2 women and 1 man have been appointed. The accepted opinion was that it is actually the responsibility of the villagers to maintain the pond.

5.0 Perception mapping

A series of sentence constructs were read out to the survey participants one after the other and they had to listen to the statements carefully and consider them in the context of their own household. They had to then let us know whether they agreed or disagreed to some or all of these statements and to what degree did they agree or disagree.

Table 8: View on storage capacity

	The total storage capacity of the tank has increased by quite a bit and there is much more water in the pond than before					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	66	90.4	48	61.5	55	72.4
Mostly agree but not totally	7	9.6	29	37.2	21	27.6
Neither agree nor disagree	0	.0	1	1.3	0	.0
Mostly disagree but not totally	0	.0	0	.0	0	.0
Totally disagree	0	.0	0	.0	0	.0

Across all three ponds, the absolute majority of the participants agreed that the storage capacity of the tanks have increased because of the dredging exercises and now it holds much more rain water. The villagers from Sennakkuppam were most definitive about this as they talked about Nalla Thani Kulam.

Table 9: Views on ground water recharge

	Over the next few years, I expect the ground water to be recharged, bringing up the water table in the village wells					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	53	72.6	25	32.1	40	52.6
Mostly agree but not totally	20	27.4	53	67.9	36	47.4
Neither agree nor disagree	0	.0	0	.0	0	.0
Mostly disagree but not totally	0	.0	0	.0	0	.0
Totally disagree	0	.0	0	.0	0	.0

Once again, villagers did report that they expected the ground water to be recharged because of the increased height of the water table due to additional water in the pond. Once again, the expectations was the highest from Nalla Thani Kulam.

Sashirekha Saravanan confirms that in summer also the borewell water level in the areas around the pond is maintained, which earlier used to become drastically low. She understands this is all because of the rejuvenation of the pond.

Table 10: Piped water vs pond water

	With the advent of piped water in our village, the pond has lost most of its importance					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	38	52.1	46	59.0	44	57.9
Mostly agree but not totally	29	39.7	32	41.0	32	42.1
Neither agree nor disagree	1	1.4	0	.0	0	.0
Mostly disagree but not totally	5	6.8	0	.0	0	.0
Totally disagree	0	.0	0	.0	0	.0

Most people agree that with the advent of piped water, the pond has lost most of its importance as a major water source for household usage. Close to 40% however most agree but not totally. The response is consistent across the three ponds.

Most people agree that if we don't get tap water (power failure, or cleaning of the tanks), they might use it. But the common opinion was that because the pond water was once dirty, they would prefer not to use it.

"We are getting water in the house, so why we should take effort and carry water from the pond" ... Sasirekha Saravanan, president, Eraiyur

Table 11: Present day water quality

	The water has become clean and fit for washing and bathing					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	4	5.5	0	.0	0	.0
Mostly agree but not totally	8	11.0	0	.0	0	.0
Neither agree nor disagree	0	.0	0	.0	0	.0
Mostly disagree but not totally	17	23.3	24	30.8	31	40.8
Totally disagree	44	60.3	54	69.2	45	59.2

Absolute majority of the villagers across both locations were of the opinion that the pond water is still not fit for washing and bathing. This has been discussed earlier and people have pointed out that because it is stagnant water, and because the leaves of plants fall on the water surface and rot, the villagers are still reluctant to use it. However, we also came across instances where children were bathing in the pond water as well.

Sasirekha Saravanan was quick to remind us that facilities are not made to wash clothes or bathe over there because there are no steps to go down and fetch water.

We have also been told that it is the 'in-migrants' who have come on rent who continue to use the water for bathing and washing and not the original villagers themselves. It may be noted that Mr. Munnusami, the ex-president of Eraiyur village, was of the opinion that the present condition of the pond there is good enough for bathing and washing.

Table 12: Drinking water source

	For many villagers, this has become an important source of drinking water					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	1	1.4	0	.0	0	.0
Mostly agree but not totally	0	.0	0	.0	0	.0
Neither agree nor disagree	3	4.1	0	.0	0	.0
Mostly disagree but not totally	15	20.5	22	28.2	22	28.9
Totally disagree	54	74.0	56	71.8	54	71.1

An absolute majority of the survey participants were of the opinion that the pond water is not an important source for drinking. For that, they have their piped water supply which gives them water at their doorstep and of acceptable quality.

Mr. Munnusami reminded us that given that the pond is close to the village, people might eat and throw waste into the pond. There are so many houses around the pond, so people might throw garbage like banana peels and other kitchen waste into it. Even in Sennakkuppam, it was reported that nobody in the village uses the pond water for drinking.

Table 13: Greenery around the pond

	Today there is a lot more greenery around the periphery of the pond					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	45	61.6	24	30.8	41	53.9
Mostly agree but not totally	27	37.0	53	67.9	35	46.1
Neither agree nor disagree	1	1.4	0	.0	0	.0
Mostly disagree but not totally	0	.0	1	1.3	0	.0
Totally disagree	0	.0	0	.0	0	.0

This was accepted by most of the respondents even though the majority at Sennan Thangal did also talk about lack of maintenance leading to overgrowth of shrubbery. In general, however, this is one aspect of the rejuvenation effort that has garnered far more appreciation than any criticism.

Table 14: Pathway around the pond

	The pathway around the pond offers an ideal spot where villagers, especially the elderly, can take a leisurely walk					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	43	58.9	42	53.8	42	55.3
Mostly agree but not totally	30	41.1	36	46.2	34	44.7
Neither agree nor disagree	0	.0	0	.0	0	.0

Mostly disagree but not totally	0	.0	0	.0	0	.0
Totally disagree	0	.0	0	.0	0	.0

Across all three sites, majority of the villagers agreed to this, even though (as we had discussed earlier), there were some issues with maintenance. The fact that when it was first constructed, many in the village, especially the elderly with diabetes, used to go for strolls around the ponds. This does still happen but some portion of the pathways being broken has been causing problems.

Table 15: Greenery and shade

	The area around the pond has lot of greenery and shade, nice place to spend some time during the summer months					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	40	54.8	35	44.9	34	44.7
Mostly agree but not totally	33	45.2	43	55.1	42	55.3
Neither agree nor disagree	0	.0	0	.0	0	.0
Mostly disagree but not totally	0	.0	0	.0	0	.0
Totally disagree	0	.0	0	.0	0	.0

There is a general feeling of agreement regarding this statement for all three ponds. Apollo Tyres foundation has planted a large varieties of exotic plants (including plants and trees) around all the ponds and they are being maintained also. The water from the ponds is also being used to water the plants.

Table 16: Prevention of flood

	This pond will prevent flood water from entering the nearby houses					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	1	1.4	0	.0	0	.0
Mostly agree but not totally	8	11.0	0	.0	0	.0
Neither agree nor disagree	10	13.7	0	.0	0	.0
Mostly disagree but not totally	34	46.6	40	51.3	39	51.3
Totally disagree	20	27.4	38	48.7	37	48.7

Villagers referring to Sennan Thangal and Gangai Amman Koil Kulam were completely against the idea that the respective ponds are a flood control safety net. For Nalla Thani Kulam, it was the popular opinion that given the height of the pond with its embankment is higher than the village, with the help of a motor water can be pumped into the pond thus preventing flooding. Others in Eraiyur were of the opinion that since there is no inlet, the flood water would not get into the pond in the first place.

Table 17: No inflow of sewage and drainage

	Sewage and drainage water are no longer being emptied in the pond					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	2	2.7	0	.0	1	1.3
Mostly agree but not totally	1	1.4	1	1.3	1	1.3
Neither agree nor disagree	9	12.3	0	.0	4	5.3
Mostly disagree but not totally	23	31.5	23	29.5	29	38.2
Totally disagree	38	52.1	54	69.2	41	53.9

Generally, most people agreed to this statement. They also reiterated that after cleaning, apart from the rare occasion where a few of the outsider families continue to dump water into the ponds, in general the local villagers have stopped dumping waste. There is no longer any inlet for household or village level drainage water to mix with the pond water.

Table 18: Pond's importance for religious festivities

	The pond has become an important part of festivities surrounding the temple that sits on its banks					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	34	46.6	27	34.6	41	53.9
Mostly agree but not totally	36	49.3	51	65.4	35	46.1
Neither agree nor disagree	3	4.1	0	.0	0	.0
Mostly disagree but not totally	0	.0	0	.0	0	.0
Totally disagree	0	.0	0	.0	0	.0

Most agreed that the pond (pond water) is an important part of festivities surrounding the temple activities of the village. We have already talked about the pond water being used for *abishek* of the deities. In this respect, the old glory of the ponds seems to have been restored.

Table 19: Maintenance by villagers

	There is already an active interest among villagers to maintain this pond now that it has been rejuvenated					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	44	60.3	48	61.5	45	59.2
Mostly agree but not totally	27	37.0	30	38.5	31	40.8
Neither agree nor disagree	1	1.4	0	.0	0	.0
Mostly disagree but not totally	1	1.4	0	.0	0	.0
Totally disagree	0	.0	0	.0	0	.0

The villagers from Eraiyur are supposedly very interested, they want to plant more trees, flowering plants around the pond. They have pledged not to dump waste and will not allow others to do so.

However, the current president of Eraiyur tells us that many people are complaining to the panchayat to maintain the pond but the panchayat does not have the funds for it.

In Sennakkuppam, villagers are questioning others if they dirty the ponds. They say the surrounding is so clean and the water has been cleaned why do you dirty it. It may be recalled that guards have been appointed in the Sennakkuppam ponds.

Table 20: Resumption of waste dumping

	In my view, it will not be long before people start dumping waste in the pond once again					
	Nalla Thani Kulam		Sennan Thangal		Gangai Amman Koil Kulam	
	N	%	N	%	N	%
Totally agree	36	49.3	45	57.7	32	42.1
Mostly agree but not totally	36	49.3	33	42.3	44	57.9
Neither agree nor disagree	1	1.4	0	.0	0	.0
Mostly disagree but not totally	0	.0	0	.0	0	.0
Totally disagree	0	.0	0	.0	0	.0

The result above might appear to be contradictory but in fact, they are not. The villagers were wary of the fact that it is the collective action of the villagers themselves that led to the deterioration of the ponds in the first place. They have all been told stories or have themselves witness the pristine state these ponds were 20-30 years ago and they have also seen that through sheer neglect and expansion pressure (of new habitations), the once pride and place of the villages had turned into complete disarray. That is why, and also considering the arrival of outsider elements in larger numbers with each passing month, the respondents were not at all confident that without direct intervention by ATF, the localites and the migrants would not resort to dumping waste in the ponds once again.

6.0 Brand equity

Everyone knows Apollo tyres has cleaned the pond. Villagers are also willing to acknowledge that this has been a great initiative and they are grateful to Apollo tyres for doing it. But, they also hold the opinion that the air gets polluted because of these tyres and it is the responsibility of the company to compensate by doing good work for the villages around this area.

7.0 Way forward

There are two activities that we are recommending that needs to be adopted by ATF going forward. The first is a soft intervention which we will call water literacy. Under this, we suggest ATF undertakes an awareness generation campaign in the three villages that reiterates the importance of these water bodies and their maintenance within the rural social fabric of Tamil Nadu. We would suggest to target the communication more to the younger generation who, in turn, will become champions of change and help monitor the efforts at preventing people from polluting/degrading these natural resources and its flora and fauna. There perhaps need to be a focused communication to the ‘outside population’

as well wherein they need to be convinced that respect for the common property resource of the villages should and has to be part and parcel of their rental commitment.

The second intervention, which we will call a more hard intervention, is to budget for a cleaning (not desludging) of the surface area of the ponds once a year. Given the financial state of the panchayats, this is one expenditure that would probably need to come from the CSR budget. However, the panchayats can be encouraged to reserved some money or create a rotational system for monitoring dumping of waste in the pond waters.



8.0 Management summary

8.1 Historical perspective

- Historically, the water from the ponds was used for religious purposes. Villagers also used to bathe in the ponds. Around a third of the respondents also agreed that the ponds facilitated the recharging of wells.
- All three ponds was used for drinking and washing clothes. Fishing was practiced primarily in the Gangai Amman Koil Kulum pond. The pond water was rarely used directly for irrigation.
- Regarding protection against flood waters, this was primarily mentioned by the survey participants from Sennan Thangal pond.
- Around a quarter of the survey participants had reported that in more recent times prior to the rejuvenation, the dependency on these ponds in their lives had come down, primarily because of deterioration of water quality and advent of piped water supply to doorstep.
- With advent of piped water, villagers have started using pond water for irrigation as well as for bathing cattle and goats, but not in Sennakkuppam, where there was a guard appointed to prevent such activities.

8.2 Pre-rejuvenation phase

- Just prior to the rejuvenation, it was confirmed by all that water quality in the ponds had deteriorated because of sewage and drainage filling (95.6%), and quality of water in terms of its smell and look had declined considerably due to pollutants and algae (75.8%)
- They also confirmed that encroachment from the sides reduced catchment water holding capacity (70.9%) and water surface was covered with water hyacinth so people could not bathe (68.3%) and ground water recharge had declined and well-water had sunk (52.0%)
- Water had become unusable for temple use and for festivals (43.6%)
- The villagers blamed the deteriorated condition of the pond completely on the in-migrants who have come to live in their village on rent and who were dumping waste into the pond despite repeated warnings.
- Further, it was also claimed that industrial waste was contaminating this water and people have started saying their skin feels itchy if they take a bath in the pond water.
- In short, the above discourse clearly justified the need for such an intervention undertaken by Apollo Tyres.

8.3 Post-rejuvenation phase

- In current times, close to four out of five survey participants believed that over the next few years, they expect the ground water to be recharged, bringing up the water table in the village wells.
- Close to three out of four survey participants believed that the pathway around their pond offer an ideal spot where villagers, especially the elderly, can take a leisurely walk;
- A little over half the respondents believed that the area around their pond has lot of greenery and shade, nice place to spend some time during the summer months.
- About 45% of the survey participants believed that their pond has become an important part of festivities surrounding the temple that sits on its banks.
- The enhanced stature of their pond leading to it becoming an important part of religious festivities was more for the Sennan Thangal pond than the other two. Similarly, the issue of more greenery around the pond as a priority outcome was mentioned only for Nalla Thani Kulam and Gangai Amman Koil Kulam.
- However, very few respondents were of the opinion that the water of their pond has become fit for cleaning and bathing, given that it is stagnant water.
- In the Gangai Amman Koil Kulam pond, the local villagers could confirm that these days, cattle and goat can drink the water, and they are given bath there as well.
- Sewage water no longer gets into these ponds and local villagers don't dump their waste there anymore.
- In Nalla Thani Kulum, the excess rain water this year got stored in this pond as it has been dug deeper, so there was no flooding of water in the village.
- In Sennakkuppam, women don't use the pond water because even though the water in the pond has been cleaned, on the other side of the pond there are houses on rent and the waste from the kitchen and the waste water from washing clothes gets mixed in this water.
- In Eraiyur, there was no maintenance of the ponds, because the panchayat does not have the finances for extra facilities like cleaning the ponds, having tower lights, etc.
- Across both villages, it was confirmed that because of the ponds, there has been an increase in the ground water, and for houses around the pond, there is more water in their wells.

- The water in the Eraiyur pond is used for fishing because the water from the pond is connected to the lake so the fish from the lake come into the pond. The water from the pond is also used for construction purposes using a motor pump. Water is pumped out for watering the plants as well.
- In Eraiyur, current the panchayat president was of the opinion that as they have made a one-time expenditure of Rs.40,000 to clean the surrounding area of the pond, it would have been better if Apollo had appointed one person to maintain the pond and the area around it.
- While in Eraiyur, the local residents don't usually use the pond water, in Sennakkuppam village, the FGD participants could confirm that the pond water is also used for the temple cleaning and doing the *abishek* of the temple idols.
- In all three projects, Apollo has built a compound and pathway around the pond and have planted many plants, herbs, and flowering plants in an effort to improve bio-diversity.
- In Eraiyur, villagers are very interested in maintaining the pond, but they collectively feel it is the panchayats responsibility but they will all help if the panchayat seeks it.
- In Sennakkuppam, it is different. Here, the villager are already questioning others if they dirty the ponds. People have been appointed to maintain the pond, for its upkeep and to ensure that it doesn't relapse to the same sad state.
- Across all three ponds, the absolute majority of the participants agreed that the storage capacity of the ponds have increased because of the dredging exercises and now it holds much more rain water.
- Regarding impact on ground water, the past and present panchayat president both confirmed that in summer also the borewell water level in the areas around the pond is maintained, which earlier used to become drastically low.
- Most people also agree that with the advent of piped water, the pond has lost most of its importance as a major water source for household usage.
- However, most people also stated that if they don't get tap water (power failure, or cleaning of the tanks), they might use the pond water but prefer not to do so as it was once dirty.
- Absolute majority of the villagers across both locations were of the opinion that the pond water is still not fit for washing and bathing since it is stagnant water, and because the leaves of plants fall on the water surface and rot.
- For drinking, people prefer to use piped water supply which gives them water at their doorstep and of acceptable quality.
- Villagers talking about Sennan Thangal did also talk about lack of maintenance leading to overgrowth of shrubbery. In general, however, this is one aspect of the rejuvenation effort that has garnered far more appreciation than any criticism.
- Across all three sites, majority of the villagers agreed that there were some issues with maintenance. Less and less people are going for walks along the pathway because some portion of the pathways are broken.
- Villagers referring to Sennan Thangal and Gangai Amman Koil Kulam were completely against the idea that the respective ponds are a flood control safety net. They feel that because embankment is high, since there is no inlet, the flood water would not get into the pond in the first place.
- The villagers were wary of the fact that it is the collective action of the villagers themselves that led to the deterioration of the ponds in the first place. But at the same time, they were not at all confident that without direct intervention by ATF, the local people and the migrants would not resort to dumping waste in the ponds once again.

8.3 Way forward

- We suggest ATF undertakes an awareness generation campaign in the three villages that reiterates the importance of these water bodies and their maintenance within the rural social fabric of Tamil Nadu. We would suggest to target the communication more to the younger generation who, in turn, will become champions of change.
- The second intervention, which we will call a more hard intervention, is to budget for a cleaning (not desludging) of the surface area of the ponds once a year. However, the panchayats can be encouraged to reserve some money or create a rotational system for monitoring dumping of waste in the pond waters.