THERIKULAM POND

KALAMASSERY MUNICIPALITY, ERNAKULAM

Detailed study on Therikulam Pond of 13th Ward of Kalamassery Municipality

APOLLO TYRE FOUNDATION &
TROPICAL INSTITUTE OF ECOLOGICAL SCIENCES (TIES)

THERIKULAM POND

KALAMASSERY MUNICIPALITY, ERNAKULAM

PRE-PROJECT STUDY

Pre-project study report and Project proposal on
Therikulam Pond, 13th Ward of Kalamassery Municipality

Study conducted by:

TROPICAL INSTITUTE OF ECOLOGICAL SCIENCES (TIES)
Ecological Research Campus, Velloor P.O., Pampady, Kottayam, Kerala. Pin. 686 501.
www.ties.org.in; tropicalschool@gmail.com

Supported by:

APOLLO TYRE FOUNDATION

Research Team

Dr. Punnen Kurian
Binny K. Babu
Aswani VR

Support Team

Sini Joshy
Roshni Susan Elias
Tina Anna Thomas

Cover Photo: Therikulam

December, 2017

TROPICAL INSTITUTE OF ECOLOGICAL SCIENCES (TIES)
Ecological Research Campus, K.K.Road, Velloor P.O.,
Kottayam, 686 501. Kerala, India.
Tel- +91 481 2503988; 09497290339.
Email: tropicalschool@gmail.com
www.ties.org.in

Preface

India is facing acute water shortage due to variety reasons including climate change, drought, ground water depletion and over exploitation and pollution resulted due to the rising population. At this point, conserving water bodies is most important owing to the increase in water demand. Rivers, lakes, ponds, streams and wells are the conventional sources of surface water. Among them, pond-ecosystem is distinct as they support wide varieties of flora and fauna including rare and threatened species and also meet rising demand of water for local community. They play an important role in supporting and maintaining ground water table. However, many of the small water bodies in our surroundings have already disappeared leading to water shortage and biodiversity loss in the region. Ponds are becoming waste dumping points and are getting filled with soil. Therefore, it is utmost important to protect ponds to safeguard our environment as well as human wellbeing.

Apollo Tyres Plant located in Kalamassery in Ernakulam comes under Kalamassery Municipality, which used to be a panchayat earlier. With the onset of urbanization, agriculture in the Kalamassery area has been drastically decreased and the change in lifestyle has led to the abandonment of paddy fields and ponds. As a major industry in the area, Apollo Tyres Ltd. has taken keen interest in the wellbeing of the local community as well as the environment. Apollo Tyres Foundation (ATF) clearly understands the significance of water and biodiversity conservation in their operational area. In this context, ATF approached Tropical Institute of Ecological Sciences (TIES) in Kottayam, a leading eco-research organization and technical partner for ATF in many environment based projects, to conduct a one month period study of Therikulam in Kalamassery. This report contains detailed information on history, geography, biodiversity and environmental issues of the Therikulam Pond in Kalamassery Municipality. The report also includes a project proposal for the conservation of the pond and how it can be supported for a sustainable community usage.

Acknowledgement

This short term study would not have been possible without the kind support and help of many individuals and organizations. We would like to express our deepest gratitude to the Corporate Social Responsibility (CSR) team of Apollo Tyres Limited, for entrusting Tropical Institute of Ecological Sciences (TIES) with the responsibility of conducting the Pre-Project study of Therikulam Pond. Special gratitude goes to CSR Group Manager, Mr. Viswabandhu Bhattacharya; CSR Coordinator, Mr. Don V. Arkkattu., and Unit Head, Mr. Thomas Mathew, for their continuous support and constant involvement in the program.

Additionally, we convey our sincere gratitude to Kalamassery Municipality officials especially Councilor of Ward 13, Mrs. Maymoonath Ashraf, Mrs. Deepa Vinod, ADS, and Mr. NP Vinod, CPM Branch Secretary.

Further, we greatly appreciate the cooperation shown by Kalamassery Village Officer and other officials at the village office in Kalamassery, who have provided the survey sketch of the pond.

The Project team gratefully acknowledges the generous support of the villagers in Ward 13 of the Kalamassery Municipality. They were very cooperative throughout the study and shared important details about the pond with us in spite of their busy schedules. PRA meeting was also successful since the stakeholders shared their knowledge about the pond in their valuable time.

And most importantly, we are highly indebted to TIES team for their guidance and constant supervision as well as for providing technical and office support throughout the tenure of the project.

Contents

CHAPTER I

GENERAL INTRODUCTION

1. BACKGROUND

Ponds are the most important surface water sources, which greatly support biodiversity, serve as sites of rainwater harvesting, ground water recharging, and support livelihood of many communities directly as drinking water or indirectly as in irrigation.

Benefits of a pond are not only limited to the beauty it brings to a place but also to water conservation, irrigation and habitation of different varieties of creatures *etc*. Also, ponds are helpful in maintaining the ecological equilibrium of an area. Collectively they support scarce species than any other freshwater habitat.

Ponds are a part of our culture. They conserve and preserve the history of a region. Through the conservation of ponds, the habitats and biodiversity will be protected, thereby large varieties of biological treasures will also be protected. Moreover, it is helpful to spread awareness among people about the importance of ponds in the protection of our environment.

Why should ponds be conserved?

Conservation of ponds is by now an acknowledged solution to water scarcity and ground water depletion. In the past, ponds were a part of our daily lives because the uses of ponds were many. It conserves water, supports agriculture and addresses different water needs, provides a viable condition for local wildlife such as birds, butterflies, dragonflies, damselflies, frogs, crabs *etc*. Ponds are an ideal habitat for lots of organisms, and they also support their breeding.

Water scarcity has emerged as one of the prominent issues faced in the world. Though Kerala is known for its water bodies, there are people, who struggle to meet their water needs and hence left farming. When a large number of people are wandering for water, a large number of water resources are ruined. Conserving ponds can definitely help us meet the rise in water demand.

Ponds provide sustainable solution to pollution and water management issues, and are identified as good sources for denitrification, sedimentation, removal of phosphorous, nitrogen and sediments from surface water. Besides, ponds support the ground water table too, which may benefit the community and nature especially during summer season. It is found that a pond of 500 m^2 is able to sequester 1000 Kg of Carbon which is equal to the amount of Carbon produced by a car (Cereghino et al.[2]). Pollution is a major threat to most of the ponds, especially when they are abandoned. Many of the ponds are left uncleaned mainly due to mismanagement.

Studies conducted by Non-Governmental Organizations show that nearly 40% of village ponds in India have been filled up for residential or office purposes in last 100 years (Dubey 148). Though ponds are

small in size but large in numbers, they are the main source of water harvesting. Their unique biodiversity and specific ecosystem functions make them important water bodies.

Many efforts have been taken by the government as well as the local community to renovate many of the ponds to meet the community needs. However, many of them did not meet the expectations and within short time, these ponds went back to the previous situation.

Apollo Foundation has been in the process of pond rejuvenation since 2014 and four ponds in Kodakara Grama Panchayat in Thrissur now stand as excellent evidences for eco-restoration of ponds with community participation. Considering the ecological and cultural significance of Therikulam pond, which is located close to Apollo Tyres plant in Kalamassery, its conservation and restoration is one of the interested areas of Apollo's biodiversity conservation.

1.2 Objectives

This pre-project study aims at conducting a detailed study on Therikulam Pond, which belongs to 13th Ward of Kalamassery Municipality, regarding its geographical details, history, cultural heritage, biodiversity and major environmental threats, and to propose a sustainable conservation of the pond. The study objectives are specified as follows:

- To conduct land survey of the Therikulam pond and its surrounding area (only public land) and to generate geographical data of the pond
- To study the quantity and quality of water in the pond and also of the fauna and flora (in and around) (current season alone- other season data will be collected from local residents through historical survey)
- To conduct a community survey to expose various stakeholders of the pond
- To study the history and earlier and current usage pattern of the pond
- To study the nature of pollution of the pond and its sources
- To propose a detailed project for rejuvenation and maintenance of the pond with management and governance plan.

1.3. Location and extent

Kalamassery is a suburb of the city of Kochi and is one of the municipalities in Ernakulam district. Located on the way to Ernakulam from Aluva through National Highway 47, Kalamassery belongs to Kanayanannur Taluk. The municipality is situated between 10° 3′ 7.09″ N, 76° 18′ 56.78″ E. As of 2001 India census, the municipality extends over an area of 27 KM^2 and has a population of 70,776 with an average literacy rate of 84%. Three-quarters of the city are high hills, its slopes, and the remainder is plain. Formed on the 1st of April 1990, the municipality has 42 wards. The wards are listed in the Fig 1.1. Circled in green is the approximate location of Therikulam pond.

Santhigiri Mattakkad Therikulam is a public pond owned by Kalamassery Municipality and is located in the 13th ward of Kalamassery Municipality. The pond is located 5 Km away from Apollo Tyres campus in Kalamassery, It is accessible through a pocket road, bounded by private lands, in Santhigiri - Mattakkad route.

Fig.1.1 Administrative map of Kalamassery Municipality

2. METHODOLOGY

2.1 Study period

Six weeks. From 15th November 2017 to December 26th December 2017.

2.2 Materials & Methods

The methods adopted for carrying out study on Therikulam pond is given below.

2.2.1 Land survey

Using Total station contours, depth and size of the pond, nature of the bottom of the pond and relevant data were collected and maps were generated. Manual excavation was also done to validate the data. Depth was measured by inserting graduated steel stumps at sequential positions of 1x1 m squares. The survey maps collected from various land record offices used to validate the data.

2.2.2 Quantity of clay and silt

Equipment such as total station and auto level measurer were used to estimate the quantity of the clay and silt. The data on quantity of clay was estimated using the graduated steel stump inserted at 1x1 m square points covering the entire breadth and length of the pond. Manual excavation was also done to validate the data.

2.2.3 Water quality studies

The quantity of water in the pond was estimated using data from the Total station and manual measurements of depth. The water samples from all five ponds were collected by TIES team on 22nd November, 2017. The complete analysis (Physico-Chemical and Biological Characteristics) was conducted at TIES's Water quality Analysis Laboratory in Velloor in Kottayam. The following parameters were tested for five water samples taken from different points in the pond; Chemical: pH, Alkalinity, Total Dissolved Solids (TDS), Total Hardness, Ca^{+} Ions, Mg^{+} Ions, Total Ions, Chloride, Fluoride, Nitrate, Sulfate Physical: Turbidity; Microbiological: Total Bacterial Count/1ml); FC (Fecal Coliforms MPN/100ml); TC (Total Coliforms MPN/100ml), *E coli* etc. using standard procedures. Procedures used are as prescribed by American Public Health Association – APHA standards (APHA, 2000).

2.2.4 Biodiversity studies

The pond area and its adjoining areas (10m radius) were thoroughly explored for floral diversity. The area was regularly observed for a period of 2 weeks – from 15th November, 2017 to 28th November, 2017 for faunal diversity studies. Observations and studies were conducted during different times of the day for a period of 2 weeks.

2.2.5 Community survey and PRA meeting

A survey was conducted among the local residents and other stakeholders in order to explore the history, usage pattern, other interests etc. using a structured interview sheet (Appendix – I). 30 respondents were used for community survey of the pond. Based on the information gathered through this survey, a PRA (Participatory Rural Appraisal) meeting of the selected stakeholders was conducted on 8th December, 2017. The meeting included Dr. Punnen Kurian, Aswani V. R. and Binny K. Babu (Project Officers from TIES), Ms. Deepa Vinod, ADS, CPM Branch Secretary, Mr. NP Vinod and other local community.

CHAPTER II

THERIKULAM POND: STUDY REPORT

1. INTRODUCTION

Santhigiri Mattakkad Therikulam is a public pond owned by Kalamassery Municipality and is located in the 13th ward. This water body was previously surrounded by paddy fields, which now have been turned to human settlements. The pond used to be a place where people gather in the evening for rejuvenation. Water from the pond was used for irrigation. However, currently the pond is abandoned mainly because of stagnant water and eutrophication.

1.1 Pond location

Therikulam pond is located nearly 5 Km away from Apollo Tyres campus in Kalamassery in the 13th ward of Kalamassery Municipality. This perennial water body, as per the village record has an area of 61.775 cents and as per the land survey, it is only 52.879 cents 21.40 Are. The pond lies between $10^0$03'50.7"N and $76^0$20'55.1."E. The area marked under green circle shows the pond in Fig. 2.1. It is accessible through a pocket road, bounded by private lands, in Santhigiri - Mattakkad route.

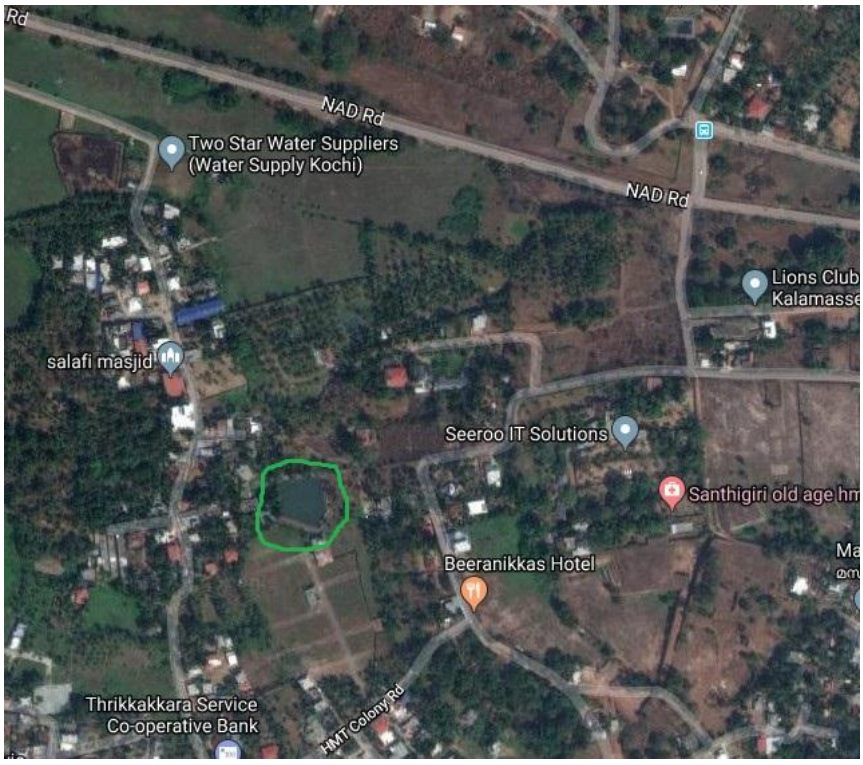

Fig. 2.1 Satellite Map of Therikulam Pond and surrounding areas.

The areas marked in green in Fig 2.2 are the Apollo Tyre plant in Kalamassery and Therikulam. The pond is roughly 5 KM away from the plant.

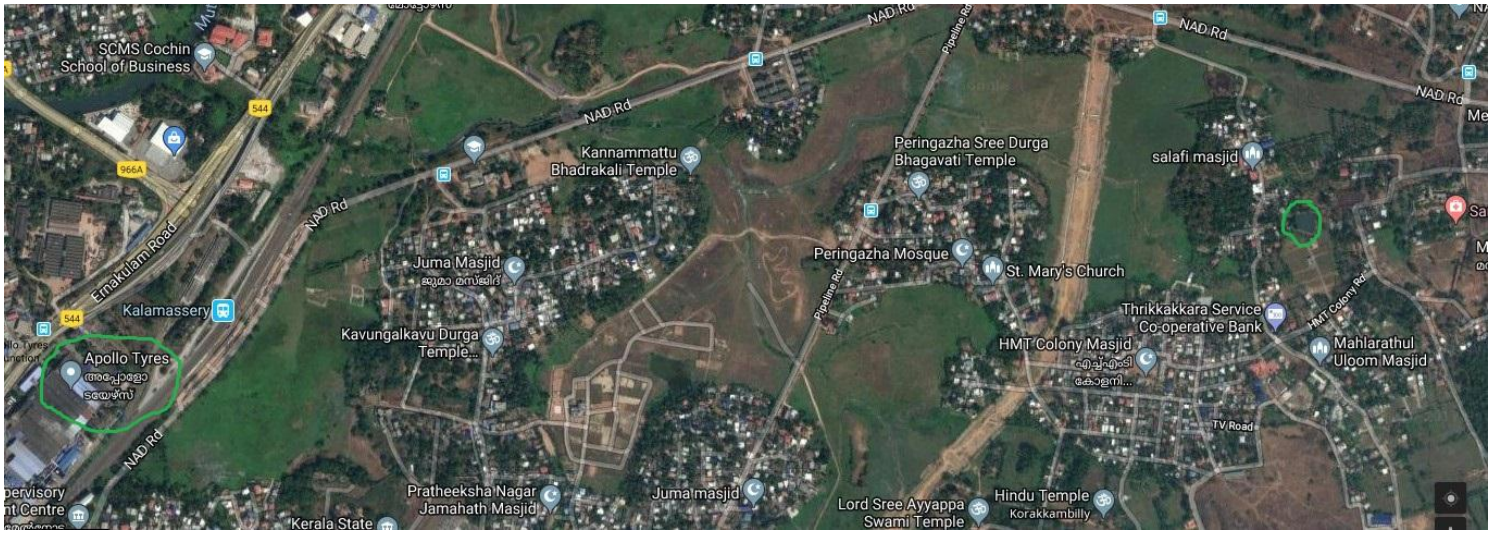

Fig. 2.2 Satellite Map of Therikulam Pond and surrounding areas.

2. RESULTS AND DISCUSSION

2.1 Community Survey Respondents' Details

30 respondents were participated in the community survey of the pond which includes the current ward councilor, Mrs. Mymoonath Ashraf, neighboring land owners and other people in the locality. Respondents were chosen randomly.

Survey Respondents	Categories	Number
Gender	Male	12
	Female	18
Age	20-40	9
	41-60	10
	61-80	11
Occupation	Local Community	19
	Local Leaders	1
	Neighboring Land Owners	10

Table. 2.1. Demographic data on the surveyed community

2.2 History

2.2.1 Origin of Therikulam Pond

It is well evident that the pond has a long history, but the generations who knew about its heritage value are very few. Therefore, the exact details about its origin are unknown. The pond is nearly a decade old. As told by the people, only a large paddy field existed in the area previously and not the pond. They required water for cultivation and maintained a low lying corner at the paddy field for water storage and irrigation. It was also used as a bathing ghat and for doing laundry. A rivulet was also passing through the area. Later, the paddy fields were turned into land and the rivulet was filled with sewage. Now the pond is cornered and Panchayat has tried to protect it.

The interpretation of respondents about the age of pond based on their knowledge or as heard from their ancestors is given in Fig. 2.3. Most of the respondents doesn't know anything about the age of the pond as many of them are new to the place (not more than 30 years). Majority of the respondents who have mentioned about the age of the pond said that the pond is more than 50 years old (23.3%). 16.6% of the respondents said that the pond is more than 100 years old. 10% of the survey respondents said that the pond is 70 years or more old.

Sainudheen, one of the survey respondents, mentioned that he had heard it from his father that the land belonged to his family named Mannayath. It was given to the then Panchayat by his great grant father for building a pond for irrigating the agricultural land. He said that the pond is nearly 100 years old. Another respondent Riyaz said that earlier the pond used to be small as it was in the olden days filled with mud because of soil erosion. Then, the pond was made bigger and renovated in the year 1974 by the then Panchayat. Another respondent Ayisha has also mentioned that Paneppili Adraman, who was a member of the Panchayat in the 1970's, is the one who took lead in renovating the pond.

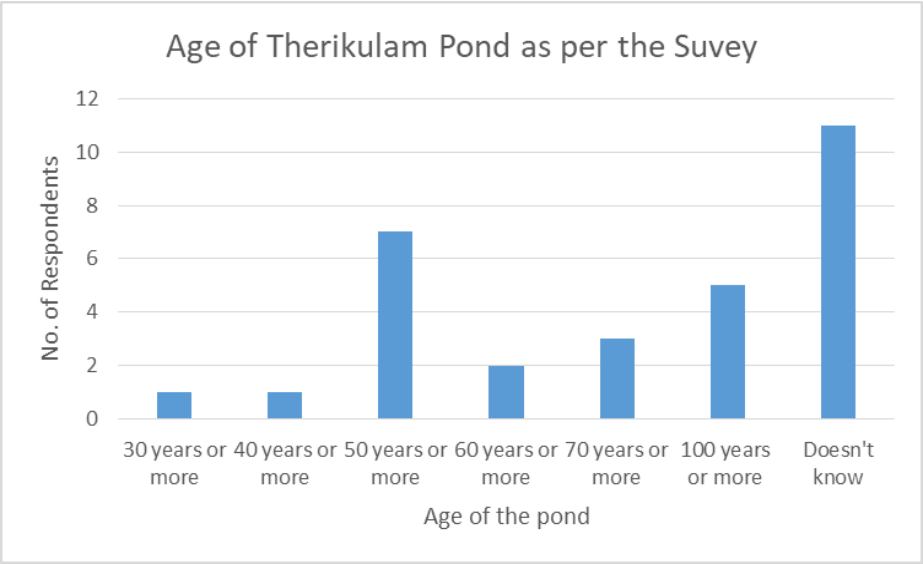

Fig. 2.3 Age of Therikulam Pond as per the surveyed community

2.2.2 Etiology of The Name "Therikulam Pond"

Majority of the respondents doesn't know about the name of the pond as indicated in the Fig. 2.4. As per the respondents, earlier the entire area where the paddy filed was located was known as *Theriyil*. Since located in the corner of the paddy field, the pond was named *Theri-kulam*.

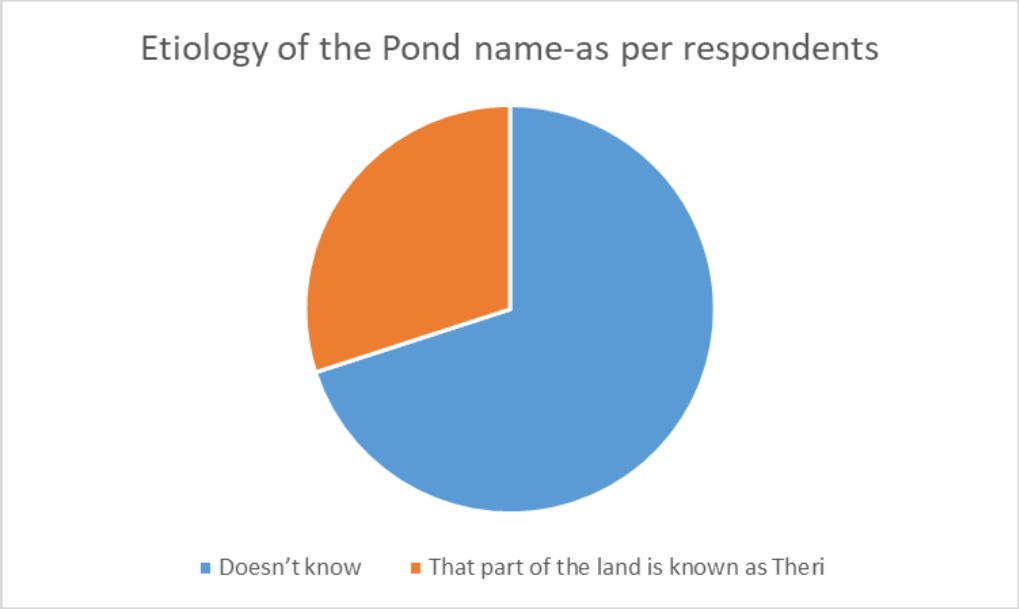

Fig. 2.4 Etiology of the Pond name-as per respondents

2.3 Physical Features of The Pond in the Past

The pond's area is rich in floral diversity. As per the respondents, the surroundings of the pond were earlier all paddy fields. However, the paddy fields were then converted to dry land by filling the paddy fields, and many houses were built on those. The pond is protected by retaining walls, and has two entrances to the pond.

There was an inlet/outlet built from the pond to a rivulet nearby. As people start to settle in the nearby areas around the pond, waste water from their houses started to come into the pond through the inlet making the water in the pond polluted. Hence, the inlet/outlet connection from the pond to the rivulet was closed. As of now, they remain closed to avoid contamination of the water in the pond. Fig 2.5 shows Therikulam pond and its surrounding landscape.

Fig 2.5 Therikulam pond and its surrounding landscape

2.4 Main Uses of the Pond in the Past and Present

One of the major uses of the pond in the past was for agriculture. As mentioned earlier, the surrounding areas were paddy fields, and the water from the pond was used for irrigating those. Since the pond was in an isolated area, a lot many of the villagers used the pond for bathing and doing laundry.

The pond was well maintained in the olden days. In 1974 -75, the then Panchayat laid the supporting walls around the pond. After that, the Kalamassery Municipality has renovated the pond. The pond was cleaned, deepened and side walls were plastered. However, as the pond is not regularly cleaned, it gets filled with weeds disallowing people from using the pond. In addition, the number of women, who earlier used to use the pond for taking bath and washing clothes, was drastically reduced as people started to build houses nearby the pond which hampered their privacy.

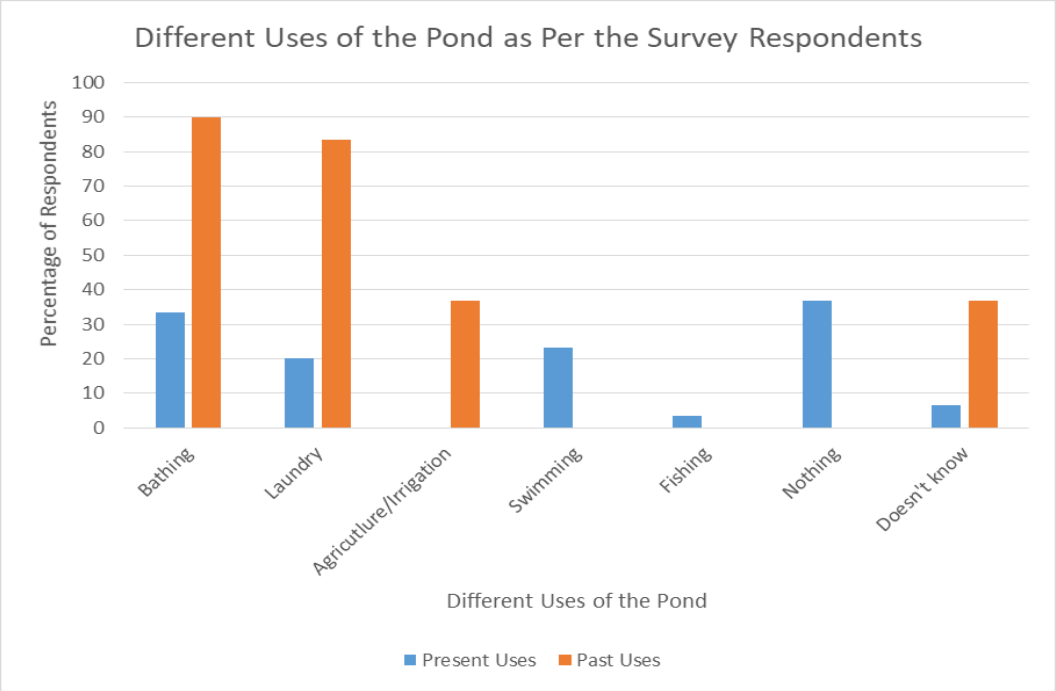

Fig. 2.6. Usage pattern of the pond in the past and the present

According to the survey conducted, 90% of the respondents mentioned that bathing was the primary use of the pond in the past, followed by laundry as mentioned by 83.3%. Around 37% of the people said that it was also used for irrigation and agriculture. 36.6% of the survey respondents doesn't know any past uses of the pond.

Majority of the respondents said that the pond doesn't have any uses now (36.6%), and 33.3% said that it's currently used for bathing and 23.3% said that it's currently used for swimming. Fig. 2.6 depicts the usage pattern of the pond in the past and in the present.

2.5 Livelihood Existed Based on Therikulam Pond

Like every pond that exists in the region, Therikulam pond was a major source of water for the farmers in the olden days. However, at present, none of the people are directly dependent on the water from the pond. The water in the pond, though not directly, helps to maintain water in the nearby wells through ground water recharging.

2.6 Linked Waterbodies of Therikulam Pond

Panchayath Kulam located in HMT colony, Ilanji Kulam in Kunnatheri, Kaavikulam in Pipeline are some of the nearby ponds of Therikulam pond. Some of those ponds are also abandoned.

2.7 Geography

2.7.1 Geographical Details

Therikulam pond is located in the 13th ward of Kalamassery Municipality. The area is marked in Fig 2.7, which is the survey map obtained from the village office in Kalamassery. As per this, the pond has an area of 61.775 cents.

The area of the pond was estimated using Total station equipment and other surveying instruments. As per the land survey, the pond has an area of 52.879 cents and 21.40 Ar. The area is marked in Fig 2.8. The pond is located nearly 5 Km away from Apollo Tyres campus in Kalamassery. The pond lies between $10^{0}03'50.7"N$ and $76^{0}20'55.1."E$. It is accessible through a pocket road, bounded by private lands, in Santhigiri - Mattakkad route.

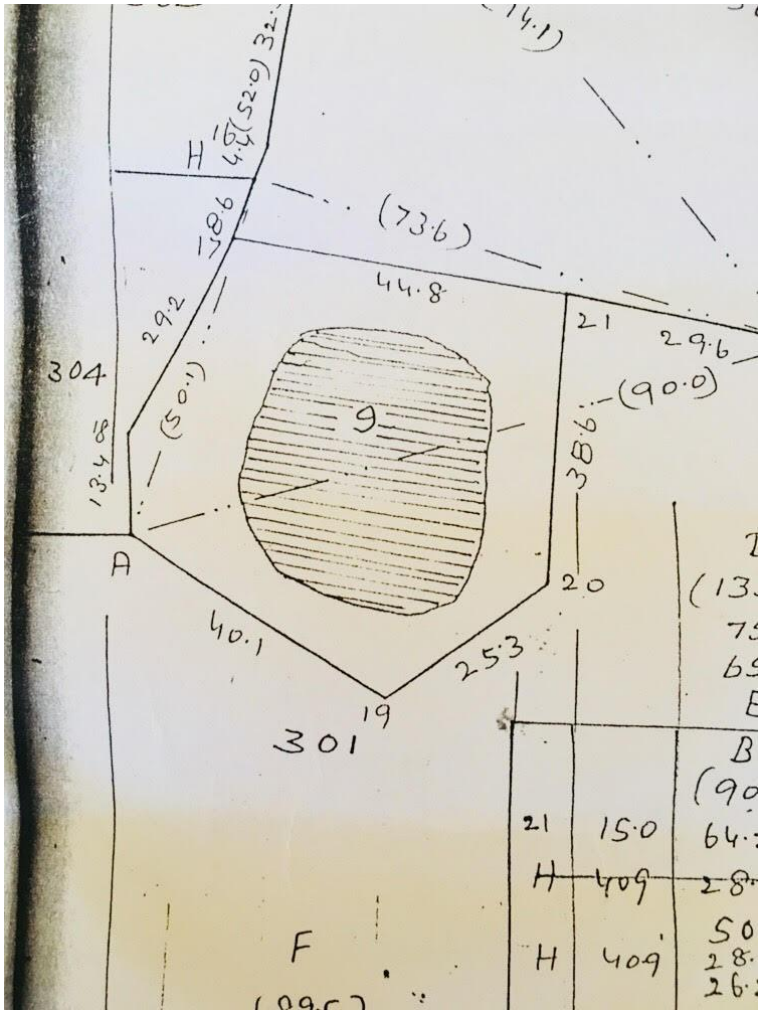

Fig. 2.7. Survey map of Therikulam Pond marked as '9'

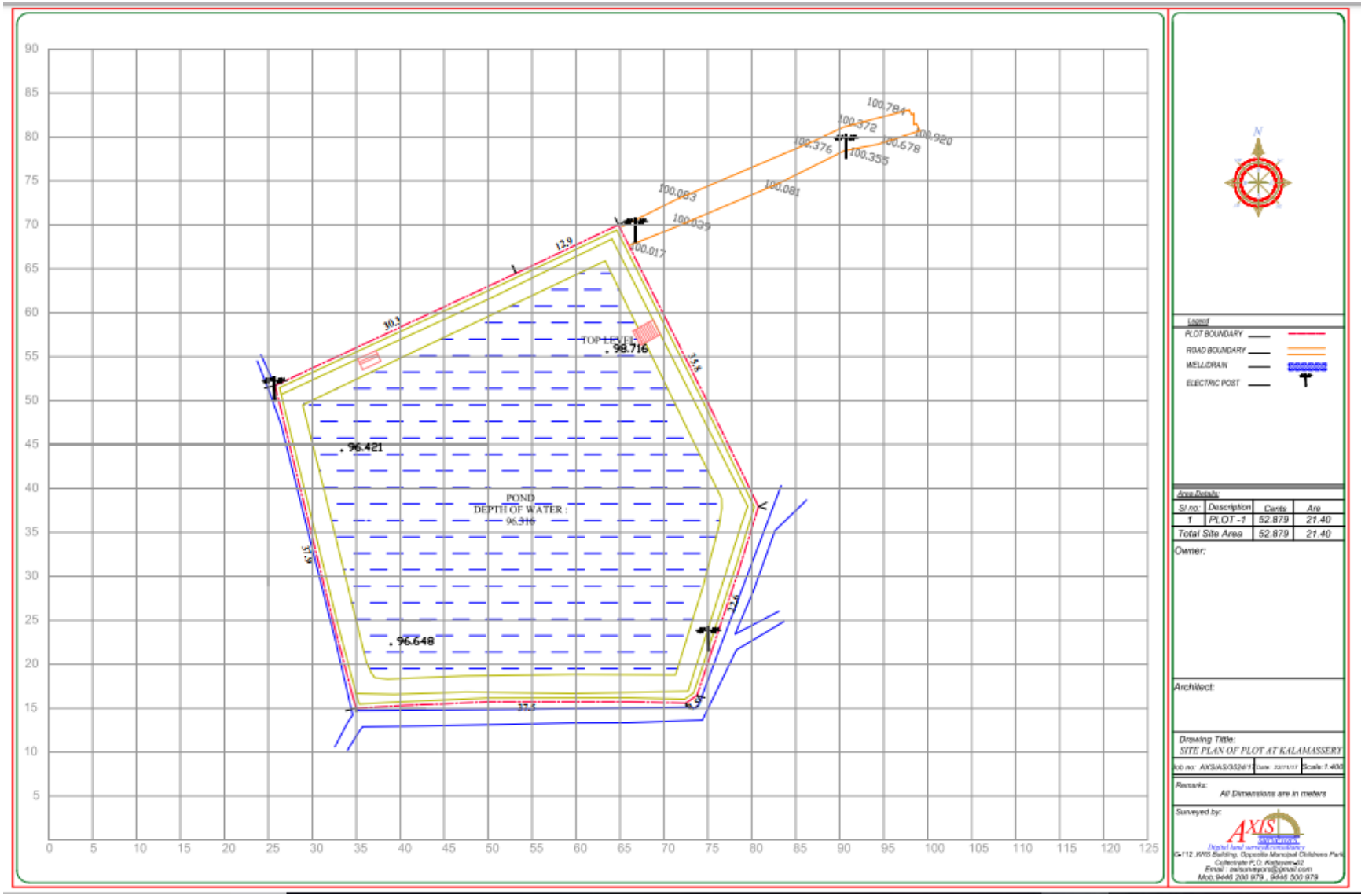

Fig. 2.8. Cross section maps of Therikulam pond showing the water and sediment levels

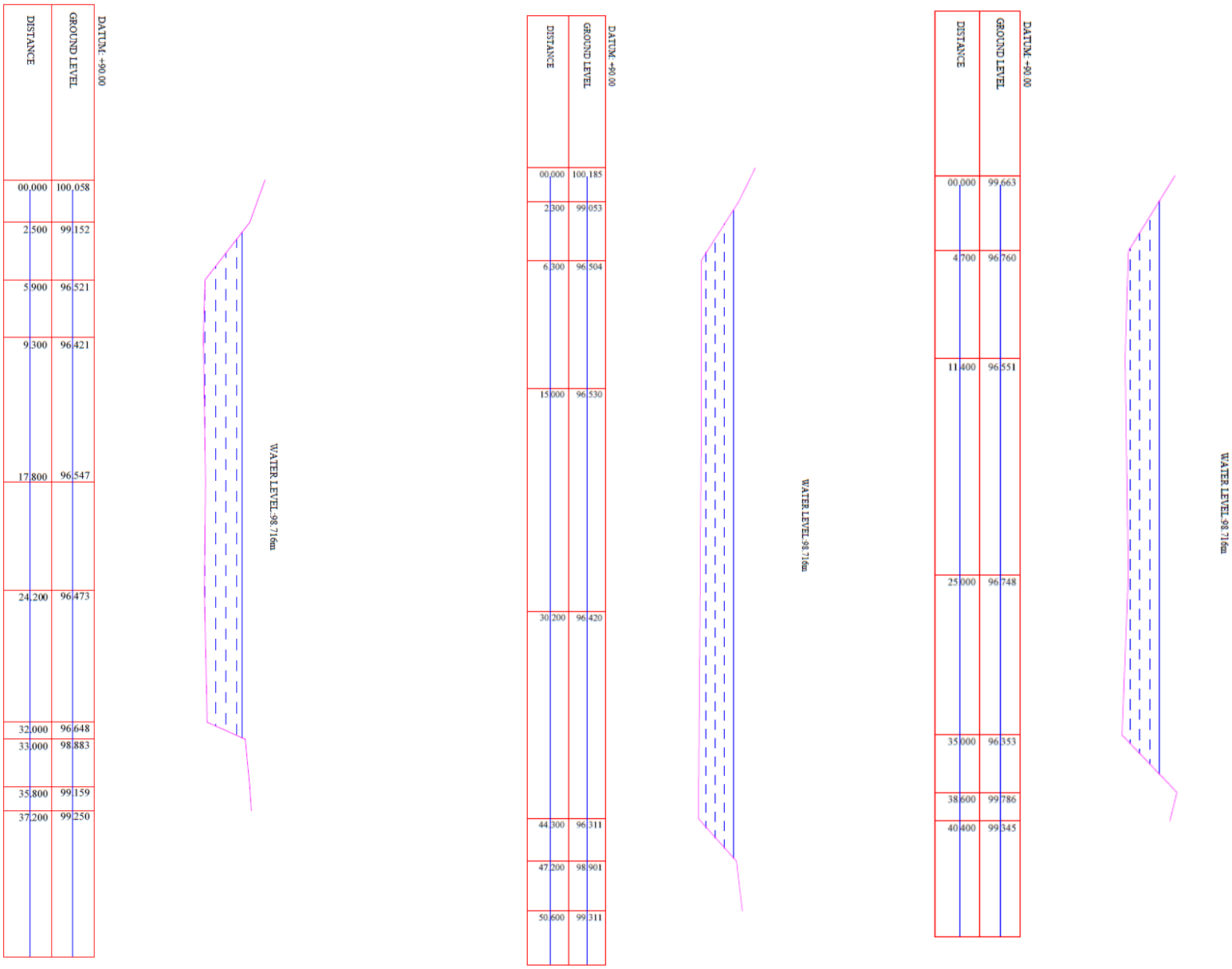

Fig. 2.9. A. Cross Section B. Cross Section C. Cross Section

Fig 2.10. TIES' team surveying the Therikulam pond and its surroundings

3.8.2 Clay and Sand Quantity Analysis

The cross section maps of the pond shows that on an average 2.6 meter deep water column exists in the pond during the survey period. But, further up to a depth of 1 meter sediment is deposited including clay.

2.8 Water Quantity and Quality

2.8.1 Water Quantity

The quantity of water available during the study period was estimated and it is found that center point of the pond has 2.6 meters depth and the sides of the pond are on average 2 meters deep. According to the local people, even in extreme summer, the pond doesn't dry out.

Fig 2.11. TIES' team surveying the Therikulam pond and its surroundings

2.9.2 Water Quality

SL. No.	Parameter	1	2	3	4	5	Permissible limit for bathing and irrigation (IS2296 standard)
1	pH	5.79	5.81	5.87	6.03	5.9	6.5 – 8.5
2	Turbidity	0.01	0.03	0.02	0.01	0.01	10 NTU
3	Total Hardness	22.0	24.0	34.0	24.0	10.0	300 mg/l as $CaCO_3$ *
4	Ca^+ ions	10.0	12.0	10.0	12.0	8.0	75 mg/l as Ca^+ *
5	Mg^+ ions	12.0	12.0	24.0	12.0	2.0	80 mg/l as Mg^+*
6	Alkalinity	20.0	22.0	12.0	20.0	18.0	200 mg/l as $CaCO_3$*
7	Total iron	0	0	0	0	0	0.3 mg/l as Fe*
8	Chloride	20.0	20.0	10.0	20.0	20.0	250 mg/l as Cl
9	Fluoride	0	0	0	0	0	1.0 mg/l as F
10	Nitrate	0	0	0	0	0	45 mg/l as NO_3*
11	Total Dissolved Solids	46.8	41.8	43.9	41.5	42.4	500 mg/L
12	Sulfate	0	0	0	0	0	200 mg/l as SO_4
13	Total bacterial count/1ml	18.0	11.0	12.0	24.0	12.0	0
14	Total coliforms MPN/100ml	2400+	2400+	2400+	2400+	2400+	0
15	Faecal coliforms MPN/100ml	210	150	210	75	150	0
16	E. coli	Present	Present	Present	Present	Present	0

Table 2.2. Results on water quality tests of Therikulam pond

Water quality of the pond was also tested employing standard procedures. A total of 5 samples are collected from 5 different parts of the pond, (1 sample from all four corners and 1 from the center). All the samples were contaminated with coliform bacteria. Since the water has fecal contamination and has coliform bacteria, it is unfit for drinking.

Fig. 2.12. Taking water samples for analysis from Therikulam pond

2.9 Biodiversity Estimation

2.9.1 Biodiversity Status Of The Pond

a. Aquatic Species

Respondents of community survey say that different species of fishes were present in the Pond. In the past, when the outlet was open, with the onset of monsoon, native fishes used to enter into paddy fields and ponds. However, when the inlet was closed, entering of fish species from the rivulet through the paddy field has stopped. Hence, the diversity of species has reduced over time. 18 of the survey respondents said that the diversity of fish species in the pond has reduced over time.

The table 2.3. demonstrates the different types of fishes seen in the pond during study period. Varaal, Muzhi and Kaari are the common aquatic species observed in the pond. Please find the table 3.4 below to find the details.

Malayalam Name	Common Name	*Scientific Name*
Muzhi	Valencienne'c clariid	*Clarias dussumieri*
Kaari	Stinging Catfish	*Heteropneustes fossilis*
Varal	Striped Snake head	*Channa striata*

Table 2.3. List of major fishes found in the pond

a. Aquatic Plants

Malayalam Name	Common Name	*Scientific Name*
Mullen Payal	Hydrilla	*Hydrilla verticillata*

Table 2.4. List of aquatic macrophytes in the pond

3.8.1 Biodiversity Status Around The Pond

Ownership	Type	Position
Personal Property	Human Settlement	North, South & East West

Table 2.5. Status of the land surrounding the pond

a. Floral Diversity around The Pond

Surrounding area of the pond is mainly human settlement and unused plot. The floral diversity around the pond is moderately rich and covered with wide variety of plants. In the past, the three sides of pond were paddy fields. However, over time, these were converted to land for human settlement.

Malayalam Name	Common Name	*Scientific Name*
Anakurunthotti	Horn bean leaved sida	*Sida acuta*
Cheeni	Chilli	*Capsicum annum*

Cheru Chembu	Colocasia	*Colocasia esculenta*
Cherula	Mountain Knotgrass	*Aerva lanata*
Chithirappala	Semi-erect Euphorbia	*Euphorbia Hirta*
Choriyanam	Climbing Nettle	*Tragia Involucrata*
Churuli	Vegetable fern	*Diplazium esculentum*
Communist Pacha	Eupatorium	*Chromolaena odorata*
Erumapullu	Buffallo Grass	*Bouteloua dactyloides*
Ezhilam Pala	Blackboard Tree	*Alstonia scholaris*
Kallurukki	Goat weed	*Scoparia dulcis*
Kaitha	Screw Pine/ Pandanus	*Pandanus*
Kappa	Tapioca	*Manihot esculenta*
Kappalam	Papaya	*Carica papaya*
Kariveppu	Curry Leaves	*Murraya koenigii*
Karuka	Bermuda Grass	*Cynodon dactylon*
Kashumavu	Cashewnut Tree	*Anacardium occidentale*
Keezharnelli	Hurricane Weed	*Phyllanthus amarus*
Koova	Arrow Root	*Maranta arundinacea*
Kotta	Java cotton	*Ceiba pentandra*
Kundala Pala	Pala indigo	*Wrightia tinctoria*
Kudakan	Indian Pennywort	*Centella asiatica*
Kulavazha	Water Hyacinth	*Eichhornia crassipes*
Kurunthotti	Country Mallow	*Sida alnifolia*
Maavu	Mango tree	*Mangifera indica*
Mashipacha	Shiny Bush	*Peperomia pellucida*
Matti	Asna	*Terminalia elliptica*
Mayilpullu	Swollen windmill grass	*Chloris barbata*
Mudiyanpacha	Syndrella	*Synedrella nodiflora*
Mukkutti	Little Tree Plant	*Biophytum sensitivum*
Murian Pacha	Goat Weed	*Ageratum conyzoides*
Oolan takara	Coffee Senna	*Senna occidentalis*
Padavalam	Snake Gourd	*Trichosanthes cucumerina*
Paanal	Orangeberry	*Glycosmis arboraea*
Parapadakapullu	Oldenlandia	*Oldenlandia corymbosa*
Pera	Guava	*Psidium gavjava*
Peruvalam	Hill Glory Bower	*Clerodendron infortunatum*
Plaavu	Jackfruit Tree	*Artocarpus heterophyllus*
Poovarasu	Indian tulip	*Thespesia populnea*
Seemakonna	Mata Ratón	*Gliricidia sepium*
Snehapullu	Love Grass	*Chrysopogon aciculatus*
Thakara	Sickle Senna	*Senna tora*
Thazhuthama	Spreading Hog-Weed	*Boerhavia diffusa*
Thekku	Teak	*Tectona grandis*

Thengu	Coconut Tree	*Cocos nucifera*
Thottavadi	Touch me not	*Mymosa pudica*
Thulasi	Sacred Basil	*Ocimum tenuiiflorum*
Thumpa	Lucas	*Leucas aspera*
Uzhinja	Balloon Vine	*Cardiospermum halicacabum*
Vankurunthotty	Broomjute sida	*Sida rhombifolia*
Vatta	Gum plant	*Macaranga peltata*
Vayara	Bitter Vine	*Micania micrantha*
Vazha	Banana	*Musa sp.*
Velutthanirvasi	Whitehead spikesedge	*Kyllinga nemoralis*
	Maidenhair Spleenwort	*Asplenium trichomanes*
	Henry's crabgrass	*Digitaria ciliaris*
	Palm Grass	*Molineria capitulata*

Table 2.6. Major flora around the pond (50 m radius)

b. BIRDS

Malayalam Name	Common Name	*Scientific Name*
Balikkakka	Large-Billed Crow	*Corvus macrorhynchos culminatus*
Cherumundi	Intermediate Egret	*Mesophoyx intermedia*
Irattavalan Kili	Greater Racket-Tailed Drongo	*Dricrurus paradiseus*
Mannathikili	Oriental Magpie-Robin	*Copsychus saularis ceylonesnsis*
Maada Pravu	Rock pigeon	*Columba livia intermedia*
Nattu bulbul	Red Vented Bulbul	*Pycnonotus cafer*
Madatha	Common Myna	*Acridotheres tristis*
Kulakozhi	White-Breasted Waterhen	*Amaurornis phoenicurs*
Kaavathi Kakka	House Crow	*Corvus splendens protegatus*
Kalimundi	Cattle Egret	*Bubulcus ibis coromandus*
Kutturuvan	White-Cheeked Barbet	*Megalaima virdis*
Kariyilakkili	Jungle Babbler	*Turdoides striatus*
Kaaka Thampuratti	Black Drongo	*Dricrurus macrocercus*
Ponman	White-throated Kingfisher	*Halcynon smyrnensis*

Table 2.7. List of birds observed in the pond area

c. Butterflies

BUTTERFLIES		
Malayalam Name	**Common Name**	***Scientific Name***
Aralishalabham	Common Indian Crow	*Euploea core*
Cheru Pulneeli	Lesser Grass Blue	*Zizina otis*
Chocolate Shalabham	Chocolate Pancy	*Junonia iphita*

Manjapappathi	Common Grass Yellow	*Eurema hecabe*
Manjathakaramuthi	Common Emigrant	*Catopsilia Pomona*
Narakakkali	Common Mormon	*Papilio polytes*
Pottuvellatti	Psyche	*Leptosia nina*
Thavidan	Common Bush Brown	*Ypthima huebneri*
Theechirakan	Tawny Caster	*Acraea violae*

Table 2.8. List of Butterflies observed in the pond area

Psyche and Common Grass Yellow are the most sighted butterflies around the pond. They are visible almost all the time in day.

d. Dragonflies And Damselflies

DRAGONFLIES		
Malayalam Name	**Common Name**	***Scientific Name***
Cheru venneran	Somber Lieutenant	*Brachydiplax sobrina*
Pandan Vayaltheyyan	Scarlet Baskar (Male)	*Urothemis signata*
Cheru Venneeran	Somber Lieutenant	*Brachydiplax sobrina*
Shalabhathumbi	Common Picture Wing (Female)	*Rhothemis variegata*
Swami thumpi	Pied Paddy Skimmer (Male)	*Neurothemis tullia*
Swami thumpi	Pied Paddy Skimmer (Female)	*Neurothemis tullia*
Theekari Muthan	Scarlet Marsh Hawk (Male)	*Aethriamanta brevipennis*
Theekari Muthan	Scarlet Marsh Hawk (Female)	*Aethriamanta brevipennis*
DAMSELFLIES		
Vella pulchinnan	White Dartlet	*Pseudagrion microcephalum*
Thanal Thumbi	Clear-winged Forest Glory	*Streams Vestalis gracilis*
Chenkali Paalthumbi	Blue Bush Dart	*Copera vittatta*

Table 2.9. Odonates of the pond area

2.10 Environmental Threats

2.11 Stakeholder And Community Response To The Proposed Project

A meeting as part of PRA (Participatory Rural Appraisal) was conducted on 8th December, 2017 at Virippil House located close to the Therikulam pond. Around 15 – 20 people from the locality including the ADS, Mrs. Deepa Vinod, ADS, and CPM Branch Secretary, Mr. N. P. Vinod have participated. During the discussion, people shared information regarding the pond such as history, management, the reason for abandonment of the pond etc. They also expressed how they visualize the pond in the future.

Fig. 2.13. Meeting with local Community as part of PRA

Fig. 2.14. Meeting with local community – as part of PRA exercise

Suggestions:

Community members have suggested the following activities to preserve the pond and make it sustainable.

- Weed Out: Though plastered, the surrounding walls of the pond is covered with plants and creepers, which needs to be removed and the walls have to be properly plastered. The water in the pond is heavily filled with aquatic weeds which doesn't let people to swim or let alone enter into the pond, which also needs to be removed.
- Retaining wall maintenance: There are serious damages for the retaining wall at different positions of the pond, especially the top portion which needs to be plastered with concrete.
- Fencing: To improve the aesthetics and to prevent animals from entering the pond, a fencing around the pond was suggested.
- Walk way: A walk way around the pond, paved properly, to increase the usability of the pond and to enhance the beauty of it.
- Two solar street lights: This is a remote area and during night time the entire area is in dark. If light is available it will be highly beneficial for the local community, especially those who are passing by the pond area to reach their home.

SUMMARY

- Therikulam is a public pond owned by Kalamassery Municipality and is located in the 13th Ward. The pond is located nearly 5 Km away from the Apollo Tyres Campus in Kalamassery. The pond lies between $10^0$03'50.7"N and $76^0$20'55.1."E.
- As per the land survey conducted, the pond has an area of 52.87 cents.
- Pond has a water column of 2.6 meter deep at the survey period.
- Pond and its surrounding area are rich in biodiversity.
- Pond water is severely polluted and hence the water is non-drinkable.
- Pond can be conserved through maintenance of side walls, providing a fencing and a walk way around the pond to get the attention of the people and to keep the area occupied.
- Most of them wants the pond to be used for swimming, hence want the side walls to be properly maintained and fenced, so that the kids can enter the pond without any hesitation.

2.12 Conclusion

Therikulam pond rejuvenation program is highly significant because it offers a chance to demonstrate the sustainable conservation and use of a pond with community participation.

■

Bibliography

Céréghino, Régis, Dani Boix, Henry-Michel Cauchie, Koen Martens, and Beat Oertli. "The Ecological Role of Ponds in a Changing World."*Hydrobiologia* 723.1 (2014): 1-6. Web.

India. Uttar Pradesh State Biodiversity Board. *The Biological Diversity of Village Ponds and Its Crucial Role in Sustainable Development*. By T. P. Dubey. N.p.: n.p., 2015. Web.

Secondary Data Sources

- BTR copies of ponds from Kalamassery Village Office
- Development Plan from Kalamassery Municipality

APPENDIX I

Ponds Historical Survey

Field Record Sheet

Date of the survey: _____

Personal Details of the Interviewee:

1. Name :
2. Age:
3. Female/Male:
4. Contact Details:
5. Employment:

Pond Historical Survey:

6. What do you know about the origin of the pond, especially regarding its age, history and management (when, why, and who made it)?
7. Have you heard of any stories regarding the origin of the name of the pond?
8. Are there any differences in the physical features and surrounding of the pond from the past (such as pond size, depth etc.), and why?
9. What are the main inlets and outlets of the pond?
10. i) What were the main uses of the pond in the past?
    a) Agriculture/Irrigation
    b) Bathing
    c) Laundry
    d) Showering Animals
    e) Others (specify):

    ii) What are the present uses of the pond?
    a) Agriculture/Irrigation
    b) Bathing
    c) Laundry
    d) Showering Animals
    e) Others (specify):

11. i) Does the pond experience seasonal water level fluctuation, especially between rainy and summer season?
    a) Yes
    b) No

ii) If yes, the drawdown height (in summer season)?

a) Below 1 foot
b) 1 foot
c) 3 foot
d) 5 foot
e) Above 5 foot

12. Have you heard of any other stories, poems, myths, beliefs, rituals, and customs associated with the pond or other nearby ponds?
13. Who owns the pond and the surrounding land? In your knowledge, does the ownership have changed at any time in the past?
14. Do you think the pond experiences any of the mentioned environmental threats?
    a) Pollution
    b) Eutrophication /covered with plants and weeds
    c) Water Quality Degradatio
    d) Biodiversity Loss
    e) Others (specify):
15. Have you noticed any of these pollutants in or around the pond?
    a) Sewage
    b) Plastics
    c) Slaughtering Wastes
    d) Other Solid Wastes (specify):
16. What are the major pollution sources?
    a) Local Community
    b) Vehicular Passengers
    c) Sewage Pollution
    d) Others (specify):
17. i) Did any livelihood exist in the region based on the pond?
    a) Yes
    b) No

    ii) If yes, specify:
    a) Agriculture
    b) Fishing
    c) Laundry
    d) Cattle Raising (a source for drinking water and showering of animals)
    e) Others (specify):
18. Fish species in the pond (past and present):
19. Does the fish diversity in the pond has reduced or changed?
    a) Yes
    b) No

20. Whether any establishments existed nearby Therikulam Pond, eg: agricultural market? If yes, specify:
21. History of any development projects occurred in the region, if any. Was the project successful? If not, why?
22. **Other Water Bodies:** Are there any other ponds in the region near to this pond? What is it's size? What are their conditions?
23. What is the significance of this pond in the region?
24. What do you think as the main reason which led to the pollution and abandonment of the pond?
25. How do you want to see the pond in future?

Looking at the pond, all I could think was that it is an incredible thing, how a whole world can rise from what seems like nothing at all.

–Sarah Desen

TROPICAL INSTITUTE OF ECOLOGICAL SCIENCES (TIES)
Ecological Research Campus, Velloor P.O., Pampady, Kottayam, Kerala. Pin. 686 501.
www.ties.org.in; tropicalschool@gmail.com