# SCHEMES IMPLEMENTED BY THE DEPARTMENT OF SOIL SURVEY & SOIL CONSERVATION UNDER THE KUTTANAD PACKAGE

## REPORT ON THE EVALUATION

ICAR - CENTRAL PLANTATION CROPS RESEARCH INSTITUTE
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EVALUATING TEAM:

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**ACKNOWLEDGEMENT**

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P. Muralidharan
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S. Jayasekhar

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## I. BACKGROUND

Kerala state has been delineated into twenty three agro-ecological units (AEUs) based on climatic variability, landform and soils. Out of these, Kuttanad is a special agro-ecological unit delineated to represent the waterlogged lands spread over 69 panchayats of Alappuzha, Kottayam and Pathanamthitta districts. Large parts of these lands are below, at or just above sea level. Climate is tropical humid monsoon type. Seawater ingress into Kuttanad is controlled through bunds and barrages to facilitate rice cultivation. Coconut is grown on the uplands and bunds of the unit and rice in lowlands. The Kuttanad wetland ecosystem is also associated with low lying sandy loam soil regions of Onattukara and coastal sandy belts. Nearly 57 % of the wetland comes in Alappuzha district, 30 % in Kottayam district and remaining 13 % in Pathanamthitta district. The Kuttanad wetland system is classified as a problem zone under the agro-climatic zonation and comprises of lowlands and midlands. Major agro-ecological zones coming under the purview of the project are Kuttanad, Upper Kuttanad, Onattukara, Southern midlands, and coastal sandy area.

The agricultural sector of Kuttanad and Onattukara ecosystems, the erstwhile granary of Kerala is now deteriorating due to a multiplicity of environmental and local problems. Kuttanad region with large areas of paddy cultivation and a tourist hot spot, requires special attention for its sustainable development. Any development could be sustainable only with the conservation of natural resources and general well being of the people. During the last many decades, Kuttanad region, one of the major Ramsar sites, has been facing serious problems of agrarian distress and water scarcity due to unscientific farming practices, short sighted development activities and scarcity of drinking water.

The increasing threat of frequent floods, drought and distressed condition of agriculture and allied sectors leading to depletion of environmental stability has greatly affected life in Kuttanad. The major portion of Kuttanad which comprises of wetland is very much sensitive to the changes in water pattern. As the area lies below mean sea level, there will be frequent inundation of salt water which would adversely affect the cultivation of paddy and other crops and the area.

When the Govt. of India announced the Vidharba Package for the development of 31 suicide prone districts across the country, Govt. of Kerala requested the Central Govt. to approve a separate Package for the Kuttanad region considering the unique problems faced in this agrarian ecosystem. Govt. of India entrusted the M.S.Swaminathan Research

Foundation (MSSRF), Chennai to study the problems faced in Kuttanad and suggest remedial measures. The MSSRF submitted its study report to the Govt. of India in 2007 identifying 15 tasks covering about 50 different activities to mitigate agrarian distress in Alappuzha and Kuttanad Wetland System.

The Govt. of India approved the study report and the interventions recommended by the MSSRF as a package on 24th July 2008. The Govt. of Kerala initiated the implementation of the Package in October 2008 with the formation of the Task Implementation Committee headed by the Agricultural Production Commissioner, Coordination Committee headed by the Chief Secretary and Prosperity Council chaired by the Hon'ble Chief Minister. Based on the strategies mentioned in the package, government departments were directed to prepare viable projects for the mitigation of agrarian distress and ecorestoration of Kuttanad wetlands. Accordingly Department of Soil Survey and Soil Conservation proposed soil and water conservation projects for the eco-restoration of Kuttanad region. These proposals gave emphasis on various water conservation activities aimed at ensuring potable water for domestic use and irrigation purposes. The activities included renovation of wells, ponds, well curbing, planting of vettiver, supply of medicinal and horticultural plants etc. The sanctioned outlay for implementing these activities in the first phase was Rs 15.25 crores. During 2013-14, government also approved the second phase of implementation of activities under the Kuttanad package for an amount of Rs 25.20 crores, wherein renovation of 213 ponds and 223 wells were included. 100% subsidy is provided to the beneficiaries under these schemes.

**Evaluation of soil and water conservation projects under Kuttanad package**

It is important that the impact of various soil and water conservation interventions aimed at the eco-restoration of Kuttanad region implemented under the Kuttanad package is evaluated so that achievements are documented, deficiency areas delineated and recommendations and suggestions for enhancing the efficiency of implementation of similar interventions in future are evolved. The evaluation is also significant as a means to achieve higher resource use efficiency in implementing natural resource conservation initiatives. ICAR-Central Plantation Crops Research Institute (CPCRI) was selected by Department of Soil Survey and Soil Conservation as the agency to conduct evaluation of the above schemes.

## II. METHODOLOGY

The activities carried out under the projects implemented by the Department of Soil Survey and Soil Conservation under the Kuttanad package included renovation of wells, ponds, well curbing, planting of vettiver, supply of medicinal and horticultural plants etc. Out of the total sanctioned amount of Rs 4197.7 lakhs, Government had released an amount of Rs. 2948.51 lakhs for implementing the activities. The entire amount has been expended for renovation of 204 ponds, 3260 wells, supply of 71601 nos of fruit plants and medicinal plants and for planting 24728 Rm vettiver in the three districts of Pathanamthitta, Alappuzha and Kottayam. Details of physical and financial targets and achievements under the project are furnished in Annexure 1. The difference between the physical target and achievement with respect to some of the interventions is mainly due to the cost escalation at the time of execution and the increase in physical size/dimensions of specific interventions in field situation, especially of the renovated ponds.

Out of the above activities representative samples of interventions were selected to conduct evaluation as per the following details.

Table 1. Interventions under Kuttanad package selected for evaluation

| SNo | Intervention | Location |
|---|---|---|
| **I** | **Renovation of pond** | **Pathanamthitta district** |
| 1 | | Thavalamkulam |
| 2 | | Perumbalakulam |
| | | **Alappuzha district** |
| 3 | | Kakazham Muhamudeen Juma Masjid |
| 4 | | Thanakulam |
| 5 | | Thiruvilakku kshetrakulam |
| 6 | | Komalapuram Plasukulam |
| 7 | | Ambanakulangara Pond |
| 8 | | Thrikovil Temple Pond |
| 9 | | Kavunkal Khsetrakulam |
| 10 | | Valiyakalavoor Pond |
| 11 | | Mararikulam Temple Pond |
| 12 | | Cheruvallisseri Temple Pond |
| 13 | | Poklasseri Sri Balabhadra Temple pond |

| | | |
|---|---|---|
| 14 | | Velorvattom Temple Pond |
| 15 | | Kandathil Sri Dharma Sastha Temple |
| 16 | | Olathala Trikayil Temple Pond |
| 17 | | Thuravoor Temple Pond |
| 18 | | Ambiyil Kadavu Pond |
| 19 | | Poovathur Sastha kulam |
| 20 | | Thevarkulam Kannanamkuzhi |
| | | **Kottayam district** |
| 21 | | Puthenkavu Bhagavathi Temple |
| 22 | | Pookkattuchira Pond |
| 23 | | Thuruthi Irattakulam |
| 24 | | Easanathukavu Devi Temple Pond |
| **II** | **Renovation of open wells** | **Name of beneficiary** |
| | | **Pathanamthitta district** |
| 1 | | Sri. Rajan, Ranjith Bhavan |
| 2 | | Sri. Madusoodanan Kizhakekara |
| 3 | | Sri. Babu, Poomangalam |
| | | **Kottayam distrcit** |
| 4 | | Easanathukavu Devi Temple |
| 5 | | Sri. Mohanan V R |
| 6 | | Changanassery Municipal Corporation |
| 7 | | Vallapplly Market, Changanassery |
| 8 | | Sri. Thomas John, Muyyappally, Thuruthi |
| 9 | | Sree Narayana Public School at Chandanikadu, Panachikkad |
| **III** | **Vetiver Planting** | **Site** |
| | | **Alappuzha district** |
| 1 | | Three drains near Mararikulam Temple |
| 2 | | Chethikadu Thodu |
| 3 | | Drain (both banks) near Poklasseri NSS Karayogam |

| | | |
|---|---|---|
| 4 | | Drain (both banks) near Olathala Trikayil Temple |
| 5 | | Banks of Pachilavelil Thodu at Ilanjimel |
| **IV** | **Supply of fruits and medicinal plants** | **Name of beneficiary** |
| | | **Kottayam district** |
| 1 | | Sri. Varghese Kurian, Plaparambil |
| 2 | | Sri. Joy Kurian, Plaparambil, Kuzimattom, Panachikkad |
| 3 | | Sri. C K Philip, Njaluvelil, Kuzhimattom |
| 4 | | Sri. K U Uthupan, Moozhippara, Kuzhimattom |

The process of evaluation included review of records and reports, minutes of meetings of committees involved in the implementation of the schemes, focus group discussion with the primary beneficiaries such as farmers and field visits to the sites to verify the status of activities/works on the ground. The performance of the project was assessed for different indicators covering efficiency in planning and design, execution, purpose served, technical evaluation of the renovated structures, impact of interventions in terms of ground water recharge, changes in water table, changes in cropping pattern and pattern of irrigation, participation of local community in the implementation of interventions, linkage mechanisms for effective implementation of project activities, mechanism for sustenance of project interventions, etc. The evaluation team consisted of Dr. A.C. Mathew, Pr. Scientist, Dr. C. Thamban, Pr. Scientist, and Dr. P. Muralidharan, Pr. Scientist. The scientists are specialized in Land and Water Management Engineering, Agricultural Extension and Soil Science.

## III. EVALUATION OF SOIL AND WATER CONSERVATION INTERVENTIONS UNDER THE KUTTANAD PACKAGE PROJECTS:

### GENERAL OBSERVATIONS

Interventions carried out under Kuttanad Package were mainly related to renovation of ponds, renovation and construction of wells. Besides, limited quantity of planting materials of vetiver, banana, fruits and medicinal plants were distributed to selected farm holdings. Details of assessment of interventions carried out under the package in three districts are furnished below.

### 1. Planning and execution of interventions

#### i. Renovation of pond

Renovation of pond was the major intervention undertaken in the 'Kuttanad Package' by the Dept. of soil survey and soil conservation. The team has visited the sites of twenty such ponds renovated. The work was more or less similar in all the interventions. In all the cases an existing pond was renovated by constructing retaining walls at all the sides. The structure was a dug out pond having its sides in natural slope. Soil prevailing in this region is loose and thereby the natural slope occurred at the sides was too low, occupying a huge area for a given capacity. Moreover the loose soils from the sides used to get eroded and the pond depth used to get reduced every year. This necessitates frequent cleaning/ de-silting of the pond, many a times once in year. Considering the labour cost involved, this work would be prohibitively costly in many cases.

Pond renovation work was planned well for each of the selected pond. Accordingly provision was made in the planning stage itself to de-silt the existing pond and to enhance the pond depth as per the requirement. Construction procedure planned was same in all the cases ie., a foundation at the bottom and above it the retaining wall both using granite stones. RCC slabs, belts, at frequent intervals as per the requirement was kept in the design and estimate. This would ensure distributing the load of the superstructure equally to the foundation thereby safeguarding the superstructure from collapsing. Cement concreting at the top of the retaining wall as a protection was also planned while designing the renovation work.

The team could observe using coir geotextiles to stabilise an embankment at one location. Slopes at the banks of 'Thanakulam' was protected using coir geotextiles. Coir geotextiles is an excellent material to protect/ stabilise slopes for a small duration, one

season effectively. Newly formed slopes, embankments/ banks of drains with steep slope that needs immediate protection from erosion are usually treated with coir geotextiles. However, being a bio degradable material it can retain its strength only for a short duration and decomposes within one or two season. Therefore it is mandatory to ensure that sufficient vegetation would come up and protect the slope by this time. Ideally seeds of closely growing grass needs to be sown along with laying the coir geotextiles. The geotextile would provide immediate protection to the slope during first rainy season and starts to deteriorate after that. By this time the grass would grow and provides permanent protection to the slope. The decomposed coir geotextile would be a bio fertilizer to the grass. However, sowing grass seeds which is an integral part of this intervention was not anticipated in the planning stage.

While executing the existing pond was first de-silted and the depth was enhanced as per the requirement. Sides were shaped and protected by constructing retaining walls at all the four sides. The retaining wall was constructed meticulously using granite stones. The construction procedure was same in all the cases. A foundation was provided at the bottom and above it the retaining wall was constructed. RCC slabs, belts, were provided at frequent intervals as per the requirement. This would ensure distributing the load of the superstructure equally to the foundation thereby safeguarding the superstructure from collapsing. The retaining wall at the top was protected generally by cement concreting and in few cases it was reinforced with steel. A parapet wall and a protective barrier generally using steel pipes were also seen in majority of the cases. This was done by the beneficiary himself in all such cases cases. The quality of work was very good in all the sites.

The could observe that all the ponds renovated served its purpose of providing a perennial water source to the beneficiaries. Except one all the ponds were effectively utilised by the beneficiaries also.

A lion’s share of the fund was spent in renovating existing ponds. Generally these ponds were massive surface water bodies created for various purposes in the past. Most of these ponds were within the premises of religious institutions. The structures were renovated by constructing retaining walls at the sides. Silt accumulation, which was a perennial problem for all these ponds, could be reduced to very minimum because of this intervention. While doing the renovation, de-silting was invariably done and the capacity, depth/ area, was enhanced in many cases. However, the exact quantification could not be carried out due lack of information on the pond dimension prior to renovation.

All these ponds draws water from the prevailing ground water table. In other words water level in the pond is the prevailing water table. These ponds did enhance the surface water resource. However, the ponds were not utilized as water harvesting structures and hence did not help in augmenting the ground water resource. The ponds could be utilized to harvesting rainwater if provision is made for diverting rain water, either from roof top or the surface runoff, in to the pond. When utilized to collect surface runoff proper filtering needs to be done to avoid silting of the pond.

Among the 24 ponds renovated only one pond, Thevarkulam Kannanamkuzhi in Alappuzha district, was effectively utilized by farmers to irrigating their crops. Only a meagre amount of water was utilised for irrigation in another three ponds. Two ponds were utilised to recharge nearby open wells, one each in the sides of these two ponds, that supply water for community level drinking water project. All other ponds were attached to religious institutions and were utilised mainly by the devotees/ local people for bathing/ recreation and other rituals. Fish culture was attempted in few ponds but was not continued due to various reasons.

**ii. Renovation of wells**

Nine open wells renovated under the scheme were observed by the team. These were planned to provide drinking water to the beneficiary farmer, except one which in a temple premise. Soil type at the sites of the open wells were loose and the well needed sidewall to protect it from collapsing. Cement concrete rings, a cost effective method to protect the sides of open wells, were planned and accordingly estimate was prepared. The same, providing cement concrete rings to protect open wells constructed in loose soils, was implemented during the execution stage. This was done very well in all the cases.

The wells were supposed to provide drinking water to the beneficiaries. All these were perennial source of water for the beneficiaries.

**iii. Planting of vetiver**

Planting of vetiver is an excellent method to protect the stream banks from erosion. Accordingly this intervention was planned and was vetiver planted at several sites to protect stream bank from erosion. However, this intervention, vettiver planting, did not serve its purpose since after care and management of the vetiver slips planted was not done properly. No plants were remaining in majority of the stream banks where they were planted. The team could observe only minute patches of these plants in the remaining sites.

**iv. Distribution of planting materials**

Distribution of tissue cultured banana, fruits and medicinal plants were the interventions planned under this scheme. These plants were very much suitable in the Kuttanad area. The distribution of planting materials of different crops could enhance agro-biodiversity in the homesteads and add to the nutritional and food security. The team visited farms of five beneficiary farmers. However, the team could see plants in only four such beneficiaries. The farmers were not happy about the tissue cultured banana since the same was not as tasty as their local variety. Majority of the farmers could not raise plants from the suckers.

**2. Change in ground water recharge/change in water table of well**

Capacity of all the ponds were enhanced while renovating the same. Enhanced size and de-silting were the reasons for the increase in the volume of the pond. The additional water reserve made did make an impact on the water availability of nearby open wells. The situation would last for a longer period since there would not be any reduction in the capacity of these ponds due silting or wall collapse.

The open wells were water harnessing structures and draws water mainly for domestic purpose only. Not much change would be there in the future only because of this intervention.

**3. Change in irrigation pattern**

Among the 24 renovated ponds inspected by the team only one pond was effectively utilised by the beneficiaries for irrigation. Constructed in March 2016 the pond, Thevarkulam at Kannanamkuzhi, has already been utilised by five local farmers to irrigate banana and vegetables for one season in an area of approximately three acres. The water from the pond was pumped using diesel pump set for irrigation. The farmers got a profit of Rs.30,000/- from banana and Rs.25,000/- from vegetable cultivation from area of 1.5 acres of leased land utilising the pond water for irrigation. It is proposed to cultivate paddy and vegetables using the pond water for irrigation in another five acres of nearby land utilising the labour available under MNREGS. Another farmer has started cultivating vegetables in his 50cents of land using the pond water. When utilised fully the pond would cater the irrigation water demand of five farmers having three acres of land for cultivation, 50 people belonging to MNREGS cultivating five acres of land and another farmer to cultivate his 50cents of land.

**4. Change in crop pattern**

Change in crop pattern was visible only in one site, ie., Thevarkulam at Kannanamkuzhi. Banana and vegetable cultivation started immediately after the renovation of this pond.

**5. Current status of interventions**

The renovated ponds and wells were well managed by the beneficiaries and remained intact at the time of team's visit. Vettiver planting as mentioned earlier nearly vanished. Very few banana plants could be seen since the farmers could not raise suckers. Fruits and medicinal plants were there in the field but not reached the flowering stage.

**6. Participation of local community in the planning and implementation**

Active participation of local community was there both in the planning and implementation stages in the case of renovation of pond and well. The interventions were mostly carried out in the premises of local temples and such other locations where organisational arrangements were in place for the community management of common property resources. This would definitely help in the proper maintenance and sustainable utilisation of structures such as ponds. However, the quality of participation of local farming community in the implementation of interventions pertaining to vetiver planting and cultivation of tissue-culture banana and medicinal plants was not at a desired level as reflected by the poor crop stand/non-sustenance of activities pertaining to these interventions in field situation.

Observations on specific interventions assessed are furnished in Annexure II.

## IV. RECOMMENDATIONS

Based on the observations made by the evaluation team on various aspects of implementation of interventions under 'Kuttanad package' following specific recommendations are made for consideration for the effective implementation of similar programmes in future.

- Majority of the ponds renovated under this scheme are very good perennial water source and is being under utilised. Efforts need to be made to extract the full potential of these water sources, especially for irrigation and fish culture.
- Slopes at the banks of 'Thanakulam' was protected using coir geotextiles. However, no seeding, sowing seeds of grass, was done along with it which is nearly mandatory to stabilise the slope for a long duration.
- In future initiatives, interventions on renovation of open wells aimed at ensuring potable water for domestic use and irrigation purposes needs to be given priority in upper Kuttanad region.
- Similarly, interventions to prevent silting up of natural water bodies, drainage courses, reservoirs etc. needs to be taken up.
- Emphasis should be given to strengthen the banks of drains/ embankments near to paddy fields to protect the same from inundation.
- Vetiver planting, an excellent intervention to protect stream bank from erosion, did not fully serve the purpose mainly due to lack of proper aftercare and management. This applies to the interventions on distribution of tissue-culture banana and medicinal plants as well. Hence, whenever this kind of intervention is implemented sufficient care should be taken to create awareness among the local community about the relevance and importance of the scientific practice recommended and also to ensure institutional mechanism involving local community for the proper after acre and management of the crops planted.
- Participation of local community should be ensured in the planning, implementation and monitoring and evaluation phase of the project. Training in PRA should be made an integral part of the planning phase of the project. The PRA techniques may be employed identify the felt needs of the local people pertaining to the NRM.

- Capacity building programmes (including training and exposure visits) should be included in the project on relevant topics related to interventions proposed in the project and training materials are to be prepared and made available to the participants.
- It may be made mandatory for collecting bench mark data on relevant bio-physical and socio-economic resource status of the project area and including the same in the proposal. Field survey, tools and techniques of PRA and secondary sources of information can be utilised for generating the bench mark data required for preparing the proposal. Similarly monitorable indicators for assessing efficacy of project implementation and impact also should be included in the proposal.
- Farmer participatory approach should be ensured for the maintenance of structures/community assets created as part of soil and water conservation interventions implemented as under the Kuttanad package.
- Efforts should be made for strengthening functional linkages among various agencies such as Department of Agriculture, Social Forestry, Local Self Governments etc for the effective implementation of soil and water conservation schemes with Department of Soil survey and Soil Conservation as the implementing agency.

**Annexure I**

## Interventions on Soil and water conservation implemented under Kuttanad package

| District | Components | Physical | | Financial (Rs in lakhs) | |
|---|---|---|---|---|---|
| | | Target | Achievement | Target | Achievement |
| Pathanamthitta | Renovation of ponds | 19 | 14 | 96.5623 | 96.38357 |
| | Well curbing | 612 | 929 | 148.35 | 148.24046 |
| | Parappet of well | 245 | 404 | 53.8 | 53.75954 |
| | Vettiver | 2089 | 2089 | 0.4 | 0.39217 |
| | Administration & training | | | 22.87 | 22.85722 |
| | TOTAL | | | 321.982 | 321.63296 |
| Alappuzha | Renovation of ponds | 236 | 144 | 1544.18 | 1573.5598 |
| | Vettiver | 14931 | 14931 | 4.59 | 4.59496 |
| | Administration & training | | | 59.75 | 30.35697 |
| | TOTAL | | | 1608.52 | 1608.5117 |
| Kottayam | Renovation of ponds | 53 | 46 | 494.3 | 495.01544 |
| | Well curbing | 1190 | 1927 | 409.45 | 408.80883 |
| | Vettiver | 7708 | 7708 | 3.83 | 3.825 |
| | Supply of med. and frt. plants | 51000 | 2402 kits, 71601 nos | 17.72 | 17.5014 |
| | Administration & training | | | 22.5 | 22.64933 |
| | TOTAL | | | 947.8 | 947.8 |
| HQ | | | | 70.2128 | 70.02471 |
| **GRAND TOTAL** | | | | **2948.52** | **2947.9694** |

**Annexure II**

## Observations /comments on specific interventions

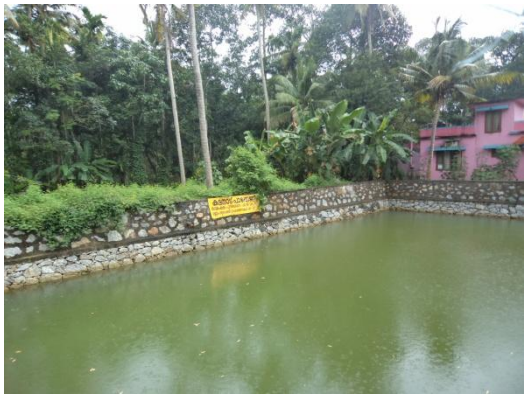
### i. Renovation of pond

Renovation of existing ponds was the major intervention undertaken in the 'Kuttanad Package'. Twenty four such ponds were inspected by the team in three districts, Pathanamthitta, Alappuzha and Kotayam. In all the case an existing pond was renovated by constructing retaining walls at all the four sides. The retaining wall was constructed meticulously using granite stones. The pattern of construction was found to be similar in all structures. Up to ground level it was dry rubble and RR above ground level with cement concreting at the top. RCC slabs (belt) were provided at regular intervals for further safety. It prevents the structure from collapsing. The ponds were de-silted in the cases and the size was increased both horizontally and vertically in majority of the cases. All these ponds get water from the ground water resource, water table. Comments/observations on the specific interventions implemented under the Kuttanad package are furnished as follows.

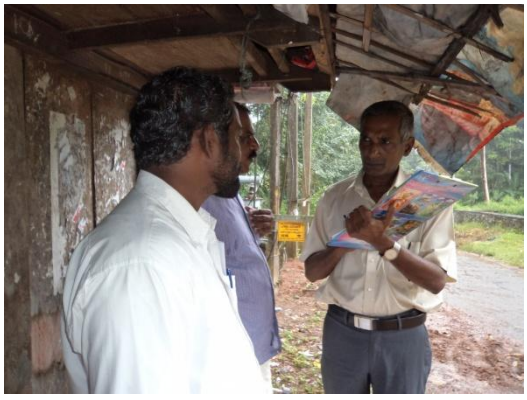
**Pathanamthitta district**

**Thavalamkulam**

An existing pond was renovated to a size of 27m L X 24m B X 3m depth. A safe outlet provided to remove excess water, if any.



Thavalamkulam Pond



Discussion with Sri. K V Prabha, the local councillor

Sri. K V Prabha, the local councillor was very much convinced about the impact of the pond. According to him the water is pumped from the pond and is used to irrigate

approximately 50acres of land. Paddy, banana, vegetables and beetle vine are the crops cultivated by the farmers using this water.

**Perumbalakulam**

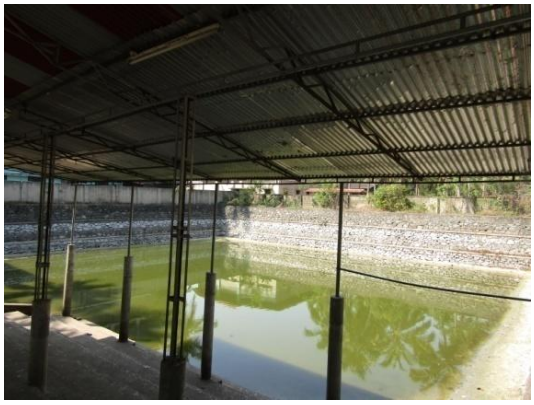
Renovation of an existing pond in a similar manner as that of Thavalamkulam Pond. Dimension of the pond is 22m Length X 16m Width X 2.5m Depth. Provision is made to take the water to the nearby fields for irrigation. However, no irrigation is done using the pond water. It is being utilized as a recreational facility, swimming by the local people.

Perumbalakulam

**Alappuzha district**

**Kakazham Muhamudeen Juma Masjid**

An existing pond was renovated to the size of 30m L X 30m B X 4m depth with an expenditure of Rs.17.1 lakhs. The existing pond was de-silted, shaped and the capacity was enhanced by increasing the depth to another 2m before constructing the granite side walls. Standard construction procedure was adopted with DR foundation, two RCC belts in between and CC at the top. The pond has been utilised mainly by the local people and people coming to the mosque for worship. A nearby school, Al Ameen School, also depend on this pond for its water requirement. Irrigation also was provided to few coconuts and banana nearby, according the convenor, Sri. M Shafeeq. Prior to the construction the mosque used to spent approximately Rs.22,000/- every year to clean the pond.



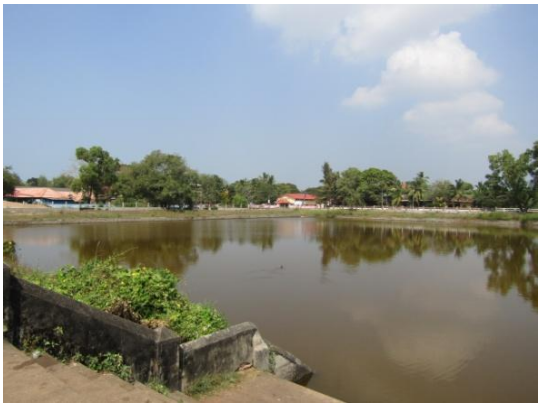
Pond at Kakazham Muhamudeen Juma Masjid

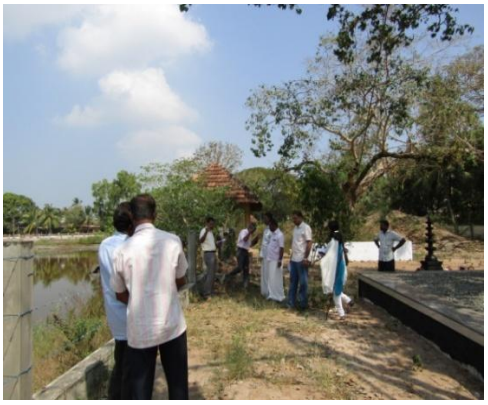
Discussion with convenor & dept. officials

**Thanakulam**

Renovation of an existing pond with an expenditure of 40 lakhs rupees in the similar manner was done to protect the same. The pond was a massive structure belonging to a local temple. Dimension of the pond after renovation was 100m Length X 100m Width X 2m Depth. The pond was cleared and deepened to one more metre prior to the construction of the side walls. The wall was only two metre deep and therefore no belt, RCC slab, was provided. Nearly 300 people used to take bath in the pond according to the convenor, Sri. Anil R. and a beneficiary, Sri. Unnikrishnan, apart from the temple rituals and activities. Nearly 1.5m elevation difference and 3m horizontal distance was there between the ground level and the side walls of the pond. This slope was protected using

coir geotextiles. However, no seeding, sowing seeds of grass, was done along with it which is nearly mandatory to stabilise the slope for a long duration.





Thanakulam

**Thiruvilakku kshetrakulam**

Thiruvilakku kshetrakulam belongs to SNDP Branch No. 3495 was renovated at a cost of Rs.10lakhs. The pond was deepened to an extra 1.5m prior to constructing the retaining wall. The capacity of the pond after renovation was 15m X 14m X 4m. According to Sri. Balakrishnan, a beneficiary the team met, the temple authorities used to clean the pond every year prior to the renovation which was labour intensive. After renovation the cleaning was done only by using pump since the silt accumulated has reduced considerably.

Thiruvilakku kshetrakulam

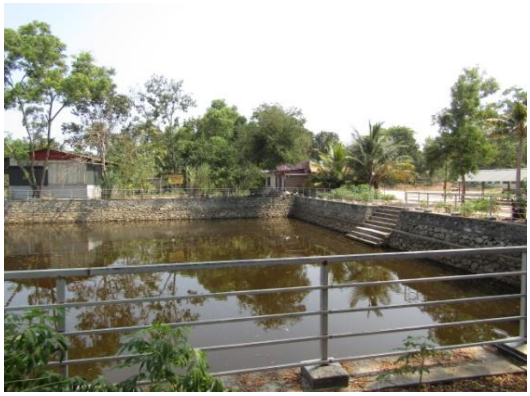
**Komalapuram Plasukulam**

The pond was a well protected earthen dug out pond belongs to the local Panchayath. The panchayath used to clean the pond every year. The region faces acute shortage of potable water. An RO plant, a water purification plant using Reverse Osmosis technique, functions near to the pond. The plant draws water from a tube well adjacent to the pond. Effluent of the RO plant is discharged to the pond. The pond was renovated by constructing retaining walls and the present size of the pond is 37m L X 34m B X 3.5 m depth. The pond is being used to rear fish, irrigate vegetables in 50cents of land nearby and for rituals of the nearby temples according to Sri. Vasudevan B, convenor and Sri. Mohan Das, a beneficiary.


Komalapuram Plasukulam

**Ambanakulangara Pond**

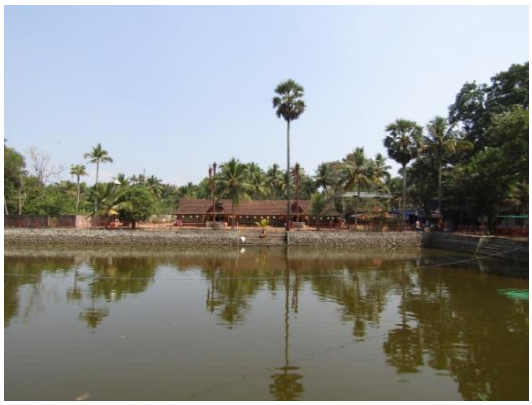
The pond was mainly used by people coming to the nearby temple for bathing. Apart from that it was used to rear fish and few local people for daily bathing. The pond was in a bad shape and was filled to a great extent with silt. During summer the pond used to get dried. People used to make a small pond within the pond at the centre by digging and the dug out soil was filled at the sides within the pond to reduce cost. The renovation was carried out by de-silting and enhancing the depth to two more metres and protecting the sides by constructing retaining walls. The rail above the retaining walls was provided by the temple authorities. Dimension after renovation was 42m L X 38.5m W X 4m D.




Ambanakulangara Pond

**Thrikovil Temple Pond**

The pond belongs to Mannancheri Ayyappa Seva Sangam Shakha No.2357. The pond was 72m L X 47m W X 3.5m D in size. Sri. Prasanth and Sri. Rajendran two beneficiaries the team met informed that the temple used to spent nearly two lakhs rupees to clean the pond every year. Construction of the retaining walls was similar to any other pond with granite stones having one belt and CC at top. Depth was enhanced to an additional 1.5m prior to the construction of the retaining wall. Very good construction. Additional protection by providing railings all around the pond was made by the temple authorities.

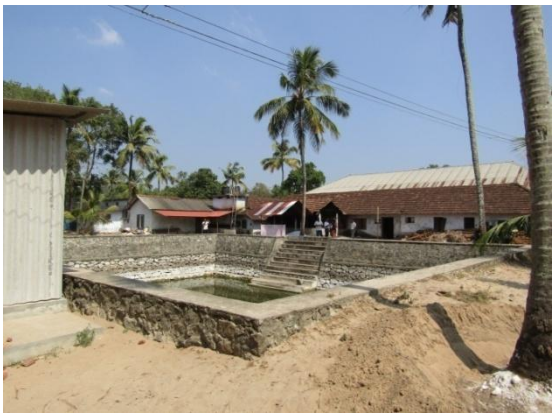



Thrikovil Temple Pond

**Kavunkal Khsetrakulam**

The pond has a dimension of 20m L X 19mW X 4m D. 1.5m additional depth was created by excavation to assure water during summer. Fifty people utilise the pond daily apart from its utilization for temple rituals. According to Mrs. Minimol, Member,

Mannancheri Grama Panchyath, the pond was a pretty good intervention that helped the local people. Children after playing in the evening used to take bath here which for them is a recreation also.




Kavunkal Khsetrakulam

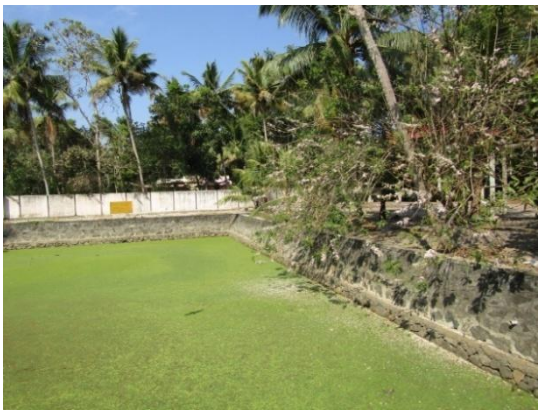
**Valiyakalavoor Pond**

The pond belongs to Valiyakalavoor Sri Krishna temple. This was having 50m L X 47m W X 3m D dimension after renovation. It is used mainly for temple rituals. Few local people utilise the same for bathing also.

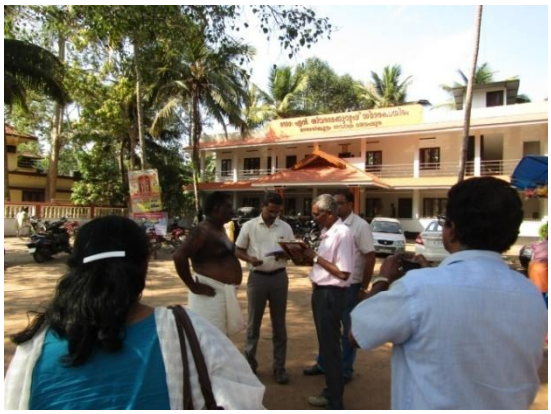

Valiyakalavoor Pond

**Mararikulam Temple Pond**

Another renovated pond having a dimension of 31.35m L X 21.35m W x 3m D. Mainly used for ritual purpose.



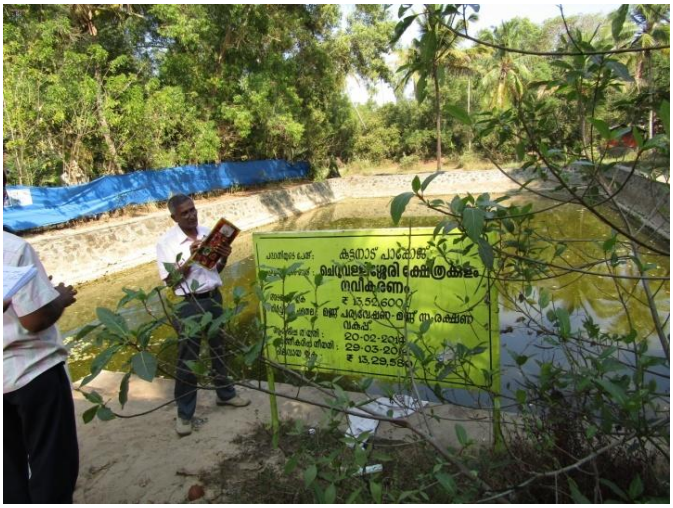
Mararikulam Temple Pond



Discussion with Temple Authorities

**Cheruvallisseri Temple Pond**

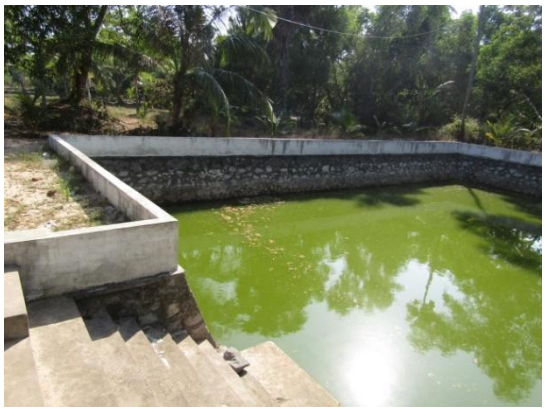
The pond was 34m L X 20m W X 3m D. Many people utilise the water for bathing. Earlier crops were irrigated by pumping from the pond.



Cheruvallisseri Temple Pond

**Poklasseri Sri Balabhadra Temple pond**

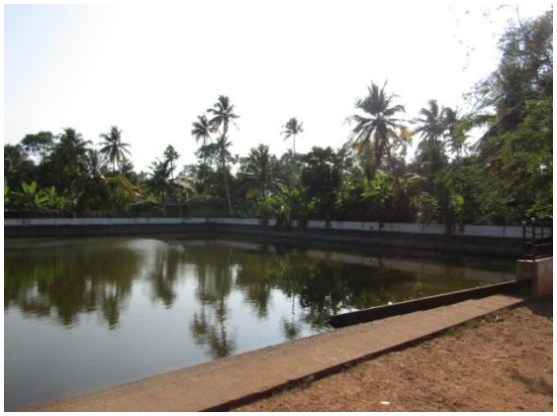
The 22m L X 22m W X 2.5m D pond was renovated mainly for the temple purpose.

Poklasseri Sri Balabhadra Temple pond

**Velorvattom Temple Pond**

A well constructed and meticulously managed pond of 56m L X 40m W X 3m D size belongs to the Velorvattom Temple. Three sides of the pond was protected by constructing retaining walls. One side where a road was passing nearby was having a retaining wall and was protected by it even before the intervention. Parapet and railings for additional safety was provided by the temple. Steps were provided at three sides for easy access. Coconut and banana plants on bank of the pond were irrigated using the pond water.

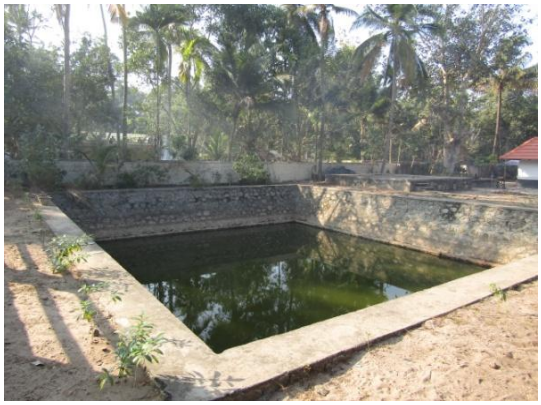
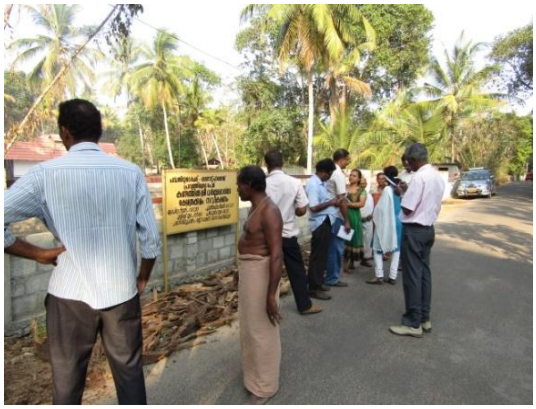



Velorvattom Temple Pond

**Kandathil Sri Dharma Sastha Temple**

Size of the pond after renovation was 15m L X 15m W X 3.5m D. Depth of the pond was enhanced by 1.5m to ensure water availability during summer. Many nearby residents gathered at the site during the team visit. All were very much pleased about the

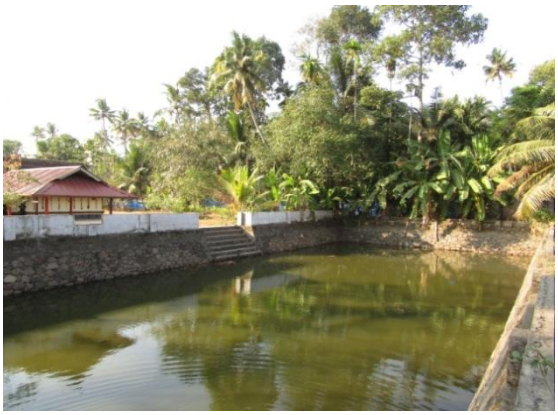
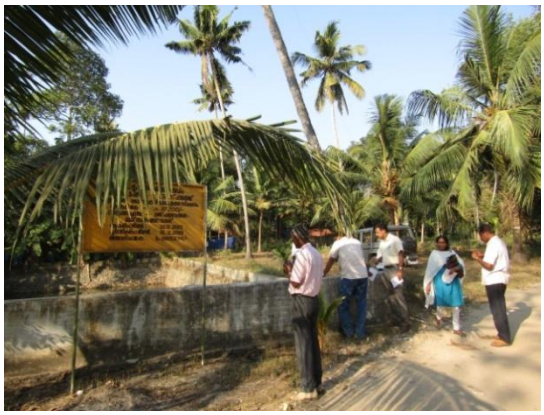
intervention. Mrs. Leela, an old lady and Sri. Vijayakumar and many neighbours gathered told that more than hundred people takes bath every day in the pond.

Kandathil Sri Dharma Sastha Temple

**Olathala Trikayil Temple Pond**

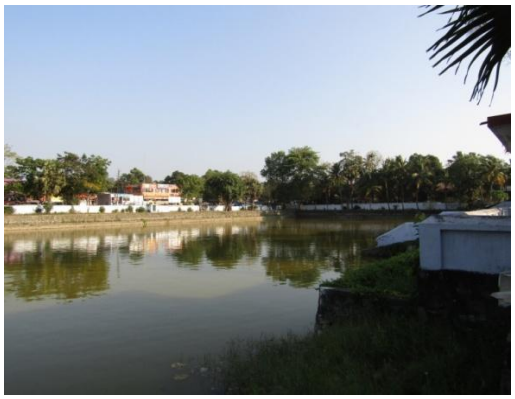
The pond was 32.1m L X 16.4m W X 2.5m D size. Parapet of the pond was constructed by the temple authorities. The water was shallow, only 50cm deep. One entrance was also provided.

Olathala Trikayil Temple Pond

**Thuravoor Temple Pond**

A pond belongs to Thuravoor Mahakshetra was renovated. A well managed pond before and after the intervention.




Thuravur Temple Pond

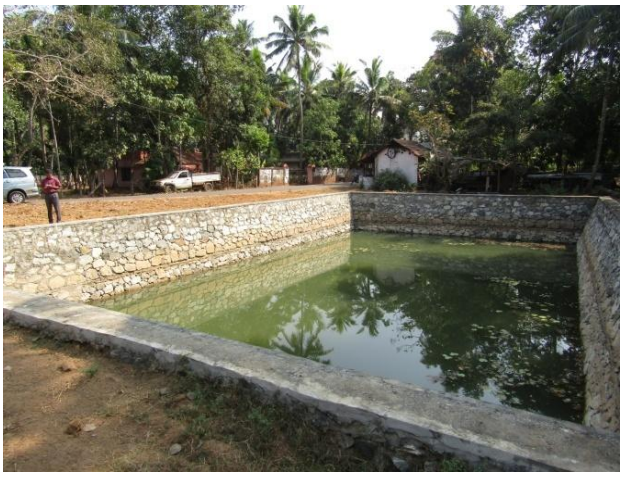
**Ambiyil Kadavu Pond**

An existing pond in a paddy field has been deepened to additional depth of 1m and renovated by constructing retaining wall at all sides. One outlet was provided for the extra water to drain off. The team could not find any benefit of the pond except that the water was used to irrigate a meagre quantity of vegetables and very few people takes bath in the pond. Farmers cultivate paddy adjacent to the pond. However, they take water from a nearby canal by pumping not using the pond.


Ambiyil Kadavu Pond

**Poovathur Sastha kulam, Kannanamkuzhi**

An existing pond was renovated after enhancing the depth. The present size is 20m L X 18m W X 2.5m D. Bathing for the local population and temple ritual are the utilities of the intervention according to Sri. Prabhakaran Achari, Chairman and Sri. Prasad, a beneficiary.



Poovathur Sastha kulam

**Thevarkulam Kannanamkuzhi**

The pond belongs to the local Grama Panchayath. A nearby temple, Srikrishnaswamy Temple, Kannanamkuzhi, utilise the pond for its rituals. The pond is a well planned and executed piece of work. It was deepened and renovated by constructing retaining walls using granite to a size of 22m L X 13m W X 3m D. Sri. Srikumar, Sri. Mohanan Nair and Sri. Hariprasad, all were beneficiary farmers and members of the Srikrishnaswamy Temple committee, were having very high opinion about the intervention. The pond used to get dried previously. This became a perennial water source after deepening. Constructed in March 2016 the pond has already been utilised by five local farmers to irrigate banana and vegetables for one season in an area of approximately three acres. The water from the pond was pumped using diesel pump set for irrigation. The farmers got a profit of Rs.30,000/- from banana and Rs.25,000/- from vegetable cultivation from area of 1.5 acres of leased land utilising the pond water for irrigation. It is proposed to cultivate paddy and vegetables using the pond water for irrigation in another five acres of nearby land utilising the labour available under MNREGS. Another farmer has started cultivating vegetables in his 50cents of land using the pond water. When utilised fully the pond would cater the irrigation water demand of five farmers having three acres of land for cultivation, 50 people belonging to MNREGS cultivating five acres of land and another farmer to cultivate his 50cents of land. A very good intervention.


Thevarkulam

**Kottayam district**

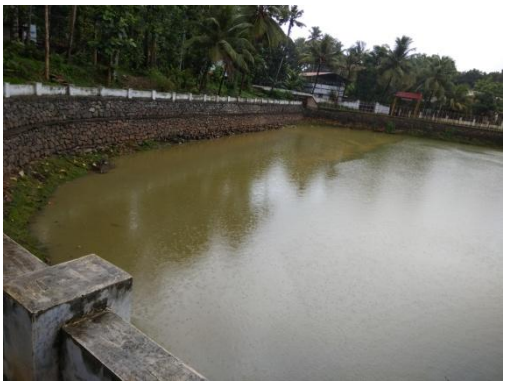
Renovation of pond was one of the major interventions undertaken in the 'kuttanad package' by the soil conservation department in Kottayam district also. The team has visited the sites of five such ponds renovated in the district. The work was more or less similar in all the interventions. In all the cases an existing pond was renovated mainly by constructing side walls. De-silting was done in all the cases and deepening/ widening was carried out in few cases prior to constructing side walls.

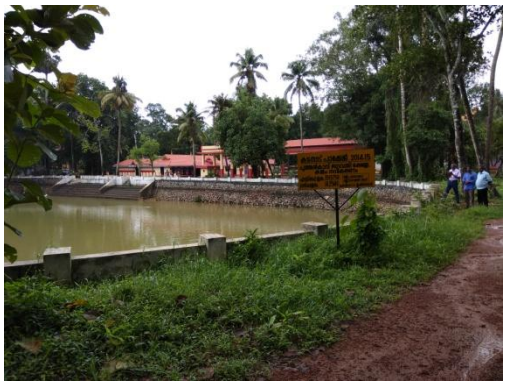
The retaining wall was constructed using granite stones. The construction procedure was same in all the cases. A foundation was provided at the bottom and above it the retaining wall was constructed. RCC slabs, belts, were provided at frequent intervals as per the requirement. The retaining wall at the top was protected generally by cement concreting and in few cases it was reinforced with steel. A parapet wall and a protective barrier were also seen in majority of the cases.

**Renovation of Puthenkavu Bhagavathi Temple**

An existing pond belongs to Puthenkavu Bhagavathi Temple was renovated by constructing retaining walls at three sides using granite stones. A granite retaining wall was already there in the fourth side of the pond, constructed by PWD to protect an adjacent road. The existing pond was de-silted, and the capacity was enhanced by increasing the depth before constructing the granite side walls. Standard construction procedure was adopted with DR foundation, one RCC belt at a height of 1.5m and CC at the top. A parapet wall was also constructed for protection. Average depth of the pond was 3.5m after renovation. The existing shape of the pond, two sides straight and other two sides near

round, was not disturbed during renovation. The pond has been utilised mainly by the devotees of the temple.

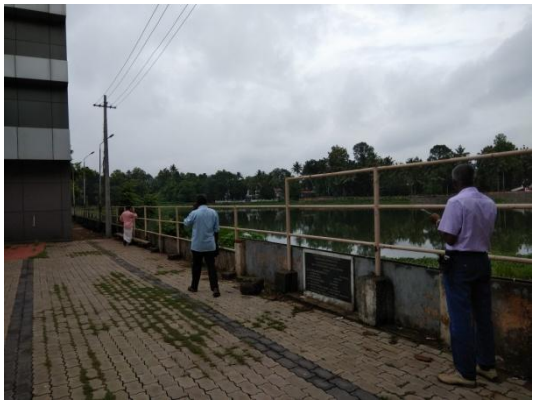




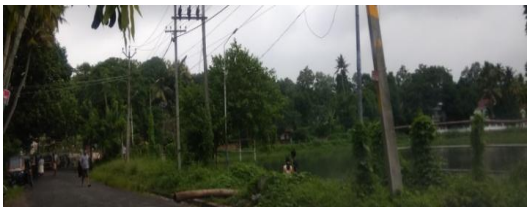
Renovation of Puthenkavu Bhagavathi Temple pond

**Pookkattuchira Pond Renovation**

A massive pond of 3.2ha area was cleared of aquatic weeds and cleaned. The pond was then de-silted and deepened to another one metre making the total depth 2.5m. The pond is adjacent to the Changanassery Municipal park and hence it attracts tourists and local people visiting the park. Sri. Sebastian Mathew Manamel, Municipal Chairman whom the team contacted was very much impressed about the renovation work. As the Municipal Chairman he would utilise the pond for tourism/ recreation purposes. Fish culture also is there in the Municipality's pipe line This was done once in the pond. The team could see many people fishing in the pond as a recreation. The Botany dept. of S B college, a nearby college, is undertaking some studies based on the pond.



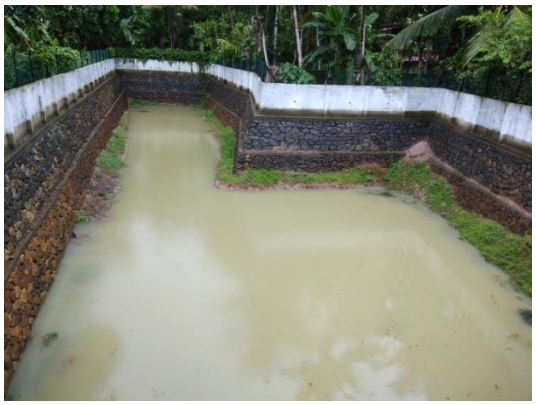
Pookkattuchira Pond



People gathered for fishing

**Renovation of Thuruthi Irattakulam**

An existing pond used to recharge an open well supplying water for 'Irattakkulam Drinking water project' that supplies water to four wards of the local Grama Panchayath. The pond was cleaned and depth was enhanced to another on metre more and the sides were protected by constructing retaining walls. Belt, RCC, was provided at a height of 2.4m for additional strength. Total depth of the pond was 3.5m. The adjacent open well used to get dried after pumping for short period during summer prior to the renovation. After renovating the pond the well yields sufficient water for supply.

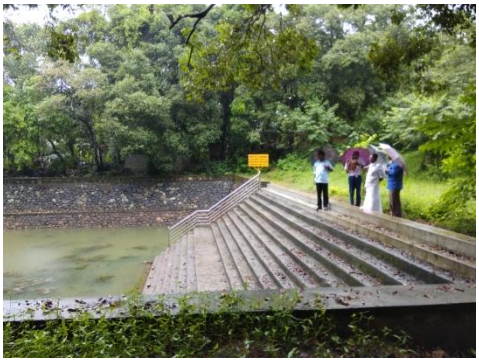


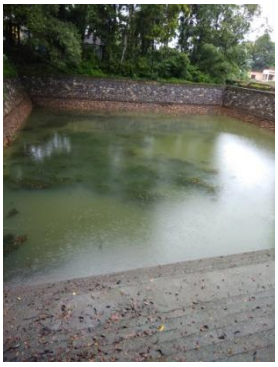
Thuruthi Irattakulam

Open well & Pump House of Thuruthi Irattakulam Drinking water project

**Renovation of Easanathukavu Devi Temple Pond**

A pond belongs to Easanathukavu Devi Temple was deepened and the sides were protected by constructing retaining walls using granite. One ramp and a step at one side were also constructed as part of the renovation. One belt, RCC, was provided at 1.8m height. Top of the retaining wall was protected by PCC and a parapet wall also was provided. The pond is of 40m length x 30m width x 5m deep. The pond is a perennial water source. The temple authorities informed that 2m standing water would be there in the pond even during peak summer. According to Sri. Radhakrishnan P., Secretary of the Temple nearly 75people used to take bath in the pond. Apart from that 25 open wells near to the temple get recharged by the water stored in the pond, according to him.





Easanathukavu Devi Temple Pond

Among the 24 ponds renovated only one pond, Thevarkulam Kannanamkuzhi in Alappuzha district, was meticulously utilized by farmers to irrigating their crops. Only a meagre amount of water was utilised for irrigation in another three ponds. Two ponds were utilised to recharge nearby open wells, one each in the sides of these two ponds, that supply water for community level drinking water project. All other ponds were attached to religious institutions and were utilised mainly by the devotees/ local people for bathing/ recreation and other rituals. Fish culture was attempted in few ponds but was not continued.

ii. **Renovation of wells**

Construction of new wells and renovation of existing wells were the other activities undertaken in the 'Kuttanad Package' in Pathanamthitta and Kottayam Districts. In both the cases these open wells were made to provide drinking water to the beneficiary. Certain cases well depth was enhanced and in majority of the cases the side wall was protected by constructing either a retaining wall using laterite/ granite stones or by providing pre fabricated cement concrete rings. The team inspected nine such newly constructed/ renovated wells at the following locations. The wells were of great relief to the farmers since they depend solely on these wells for their drinking and other domestic purposes. The only exception was an open well made in the premises of Easanathukavu Devi Temple, the water of which was used for temple rituals. Location and other details of the open wells is given below.

**Pathanamthitta district**

Construction of open wells was another activity under the project. These open wells were constructed to provide drinking water to the beneficiary. All the wells were of similar type where concrete rings were provided to prevent the sides from collapsing. The team inspected three such newly constructed wells at the following locations in Pathanamthitta district. All the beneficiaries belonged to SC category. The wells were of great relief to the farmers. It is evident from the fact that the farmers got only a portion of their expenditure from the scheme. They themselves contributed for the balance amount required for the construction.

1. Sri. Rajan, Ranjith Bhavan
2. Sri. Madusoodanan, Kizhakekara
3. Sri. Babu, Poomangalam



Open wells

**Kottayam district**

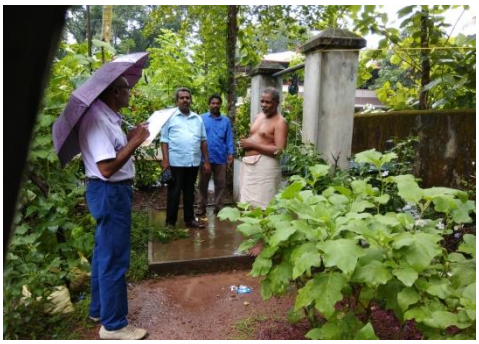
**Easanathukavu Devi Temple**

An existing open well in the premises of Easanathukavu Devi Temple was deepened to 12m depth and parapet walls and two pillars constructed to provide rope and pulley to fetch water from the well. The temple authorities informed that there was no water shortage even during peak summer.

Open well renovated in the premises of Easanathukavu Devi Temple

**Sri. Mohanan V R**

The open well of Sri. Mohanan V R, Ambazhaparambu, Payipadu was collapsed and was renovated under this scheme. The sides were strengthened by providing cement concrete rings with an amount of Rs.32,000/-. Depth of the pond after renovation was 23m. The water was used mainly for domestic consumption and to irrigate the kitchen garden having cow pea, brinjal, chilli etc.

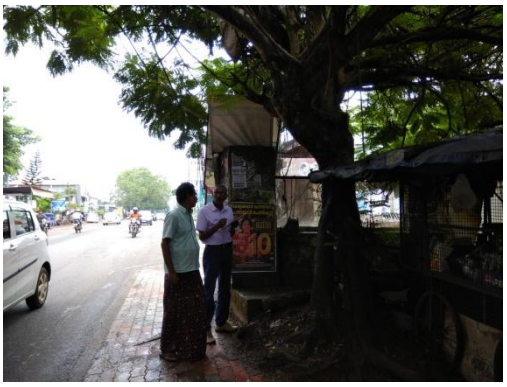


Open well of Sri. Mohanan V R

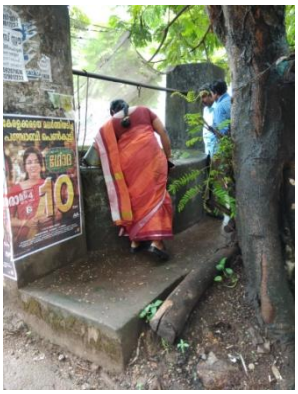
**Renovation of an open well belongs to Changanassery Municipal Corporation**

An open well belongs to Changanassery Municipal Corporation near Pareppally church was renovated by after cleaning and de-silting. A parapet wall was constructed for additional safety since the well is just near to a tarred road. Sri. K M Antony (Babychan), a

nearby merchant, informed the team that the well is a perennial water source and during summer more than fifty people utilise the well. The well is approximately 10m deep.



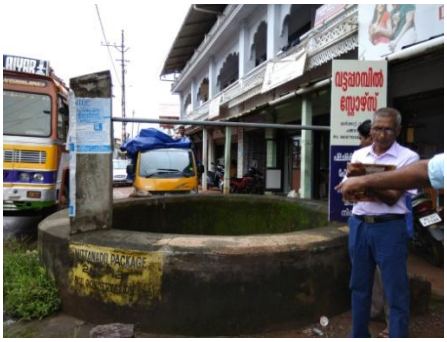
Discussion with Sri. K M Antony



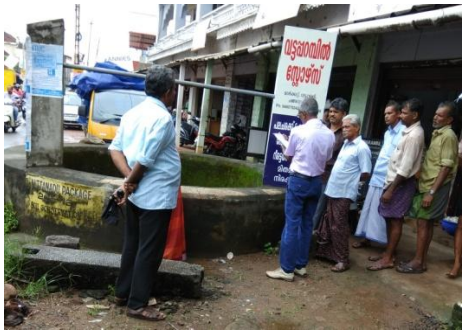
Open well near Pareppally church

**Renovation of an open well in Vallapplly Market, Changanassery**

An open well in Vallapplly Market, Changanassery Municipal Corporation which was a perennial water source for many people was renovated. The well was cleaned, de-silted and a parapet wall with provision for rope and pulley was constructed using the fund. Sri. James John, Vattaparambil stores and Joseph Antony, Maanjerikalam Agencies, two merchants adjacent to the well were very much impressed and convinced about the renovation work. According to them nearly 600 people, mainly labourers and other in the market, utilise the well daily for various purpose. The well is a perennial water source for the people in the market.



Open well in Vallapplly Market, Changanassery



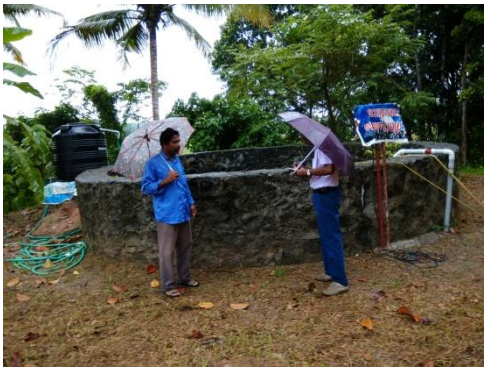
Discussion with beneficiaries

**Construction of new open well**

A new open well was constructed to provide drinking/ domestic water in the premises of Sri. Thomas John, Muyyappally, Thuruthi. The pond was dug and the sides were protected using cement concrete rings.

Open well of Sri. Thomas John

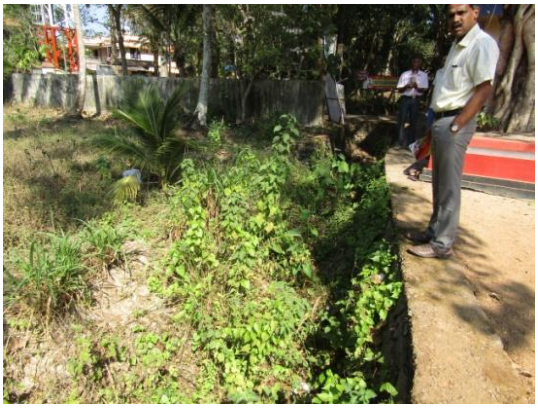
Another new open well was constructed in the premises of Sree Narayana Public School at Chandanikadu, Panachikkad Grama Panchayath. An open well of 12m diameter and 12m depth was dug and retaining was constructed to protect its sides. The pond was used by the school to provide drinking water to the students. School authorities informed that the pond is utilised by the nearby public also for drinking water. A parapet wall was constructed for additional safety.



Open well at Sree Narayana Public School

### iii. Vetiver Planting

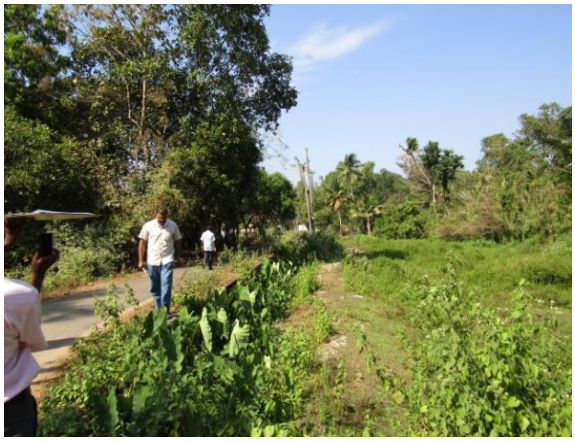
The team visited three sites where vetiver planting was done to protect the stream banks of drains. In the first case vetiver planting was done at one side of a drain near Mararikulam Temple. Majour portion of the drain, at both the sides, was protected from stream bank erosion by constructing retaining walls using granite by local Grama Panchayath. A small portion (10m) left unprotected was planted with vetiver, an excellent grass to protect the stream bank from erosion. However the team could see only a single plant. It was informed that local people uprooted the grass to take the root.



Vetiver Planting

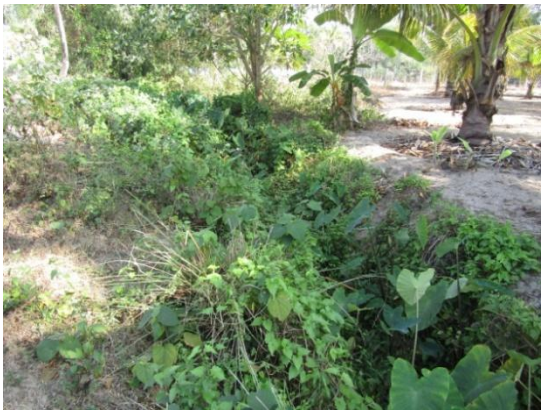
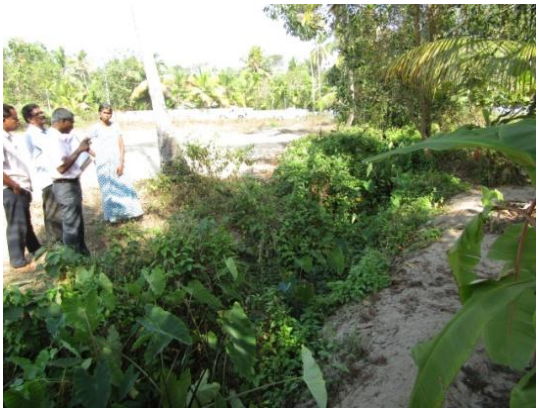
The second case was also to protect a drain near the temple. As in the previous case the team could see only a few plants.

The third site was also near to the temple where one side of a drain (120m) adjacent to a tarred road was protected by planting vetiver. However, the team could see only traces of the plant.



Vetiver Planting

Another site where the intervention was taken up was in Chethikadu Thodu. The stream banks to a distance of 600m was protected by planting vetiver at both the sides. The work was carried out in 2011-12 and the team could see only a few plants remaining at the time of visit.

Vetiver Planting

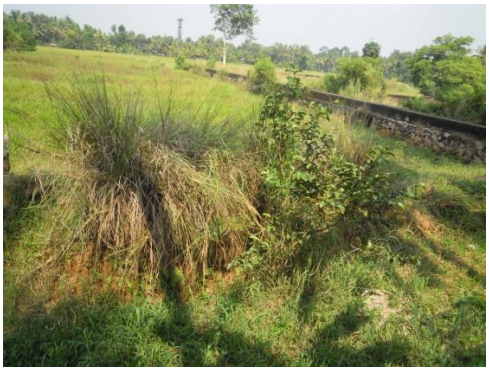
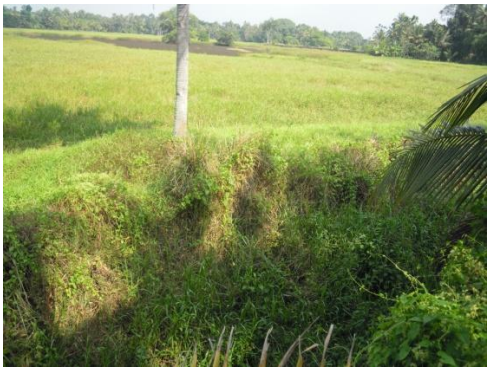
Another site of vetiver planting the team visited was near Poklasseri NSS Karayogam where both the sides of a drain, approximately 300m, was protected by planting vetiver. However, the team could not see even traces of the intervention.

The next site was near to Olathala Trikayil Temple where both the banks of a drain with a dead end was protected by planting vetiver. The team could not find any purpose for the intervention. They could not find any vetiver plant also still remaining.

Vetiver Planting

Vetiver planting was done to stabilise one bank of 'Pachilavelil Thodu' at Ilanjimel. Banks of a drain was protected in majority of the places by constructing

retaining walls. One side of the drain is in upper elevation (private holdings) and the other side paddy field. The bank at the paddy field side was not protected by retaining wall at some locations. These were protected by planting vetiver explained the convenor. It was planted two years back. The team could observe only patches of vetiver planting due to lush growth of weeds and other plants.

Vetiver planting to stabilise one bank of 'Pachilavelil Thodu'

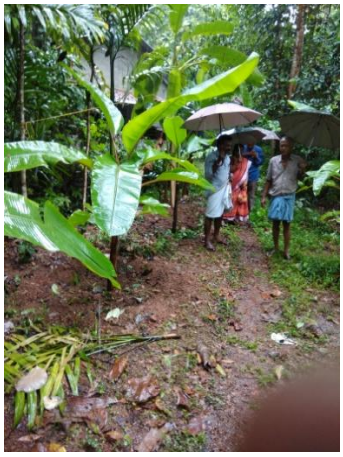
Though, the team made efforts to locate vetiver planting in other districts it could not be seen.

**iv. Supply of fruits and medicinal plants**

Seedlings of fruit trees and tissue cultured banana were the two item the team could evaluate in the District. Five farmers to whom the seedlings were distributed were contacted. However, the trees/ banana were observed only in the farms of four farmers. Details of which is given below.

**Sri. Varghese Kurian, Plaparambil**

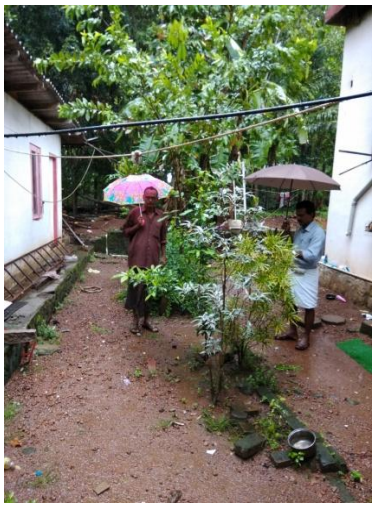
Ten number of tissue cultured banana seedlings of two different varieties were supplied to the farmer. The farmer could get bunches having average weight of 8kg. However, the farmer planted suckers of only one variety next time, a red one. According to him the other variety was not tasty.The team could see only few plants of the red one during evaluation.

Tissue cultured banana in the farm of Sri. Varghese Kurian

**Sri. Joy Kurian, Plaparambil, Kuzimattom, Panachikkad**

The farmer got seedlings of Rambuttan, Guava, Sapota, Gooseburry and Aryavep. Apart from that he got ten tissue cultured banana seedlings also. But none of them yielded.



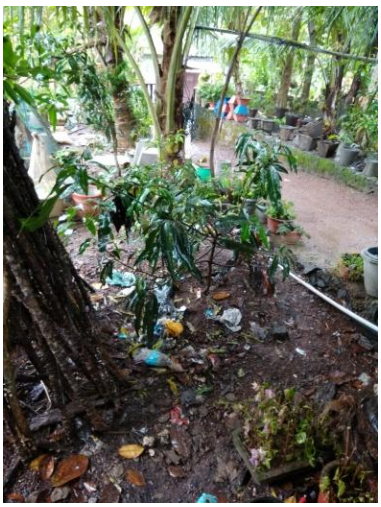
Sri. Joy Kurian

**Sri. C K Philip, Njaluvelil, Kuzhimattom**

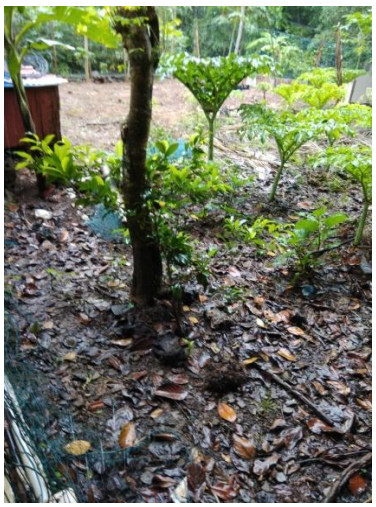
Sapota and tissue cultured banana were the items received by the farmer. However, the team could not se any plant during its visit.

**Sri. K U Uthupan, Moozhippara, Kuzhimattom**

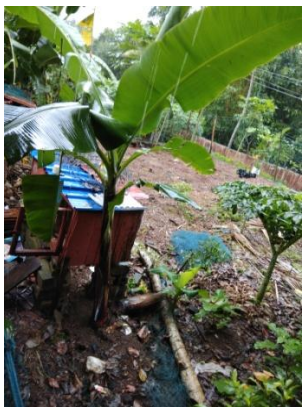
Sapota, Mango, Nutmeg and tissue cultured banana were the items received by the farmer. Unlike the other farmers this farmer got four bunches from successive suckers for the variety Robusta. Other varieties received by the farmers got dried due to shortage of water.



Mango



Sapota

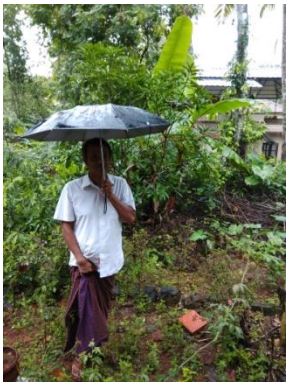


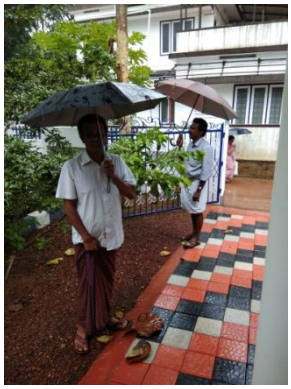
Tissue culture banana (Sucker)

Discussion with the farmer

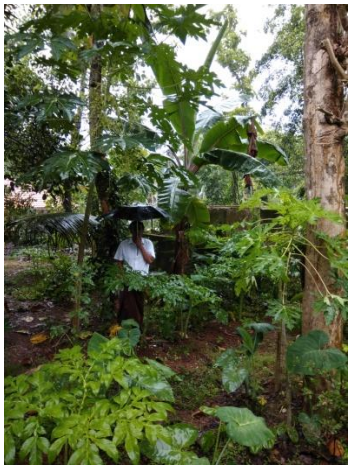
**Sri. Abraham Varghese, Kattupuram, Kuzhimattom**

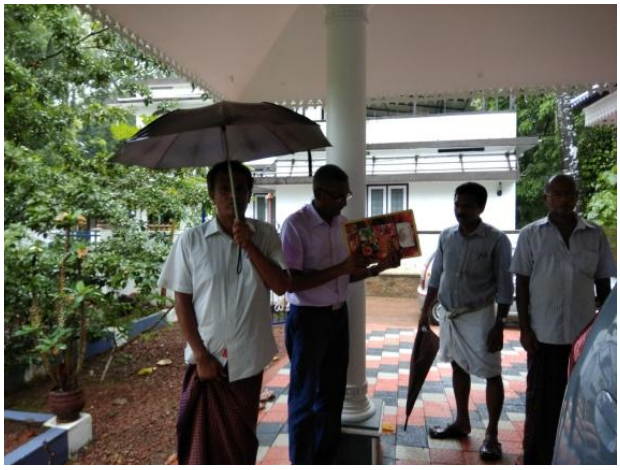
The farmer received sapota, Aryavep, Guava, Banana-Chempoovan variety and Mango. Tissue cultured banana supplied by the Dept. was harvested and the farmer has its second generation plant at the time of the team's visit. Among the fruit plants only Guava started yielding.





Farm of Sri. Abraham Varghese





Farm of Sri. Abraham Varghese