



**A pilot project for sustainable and durable
development through integrated water resources
development in a selected village in coastal
Tamil Nadu, India**

**KOTTAKARAI VILLAGE
AUROVILLE, INDIA**

Progress Report

AUG-OCT - 2007

BY

**AUROVILLE WATER HARVEST
NAIDU HOUSE, KOTTAKARAI
AUROVILLE – 605 101 TN
INDIA**

Activities Status:

Sr.no	Name of the Activities	Quantity	Status
1	Sanitation		
	Construction of Eco-san toilet	59	Completed
2.	Water supply		
	Elevation survey	3 nos	Completed
	Designing of new distribution system	3	Completed
	Village old tank distribution system	1	Completed
	Bharathipuram tank distribution	1	Completed
	Colony tank distribution	1	Completed
3	Water recharge		
	Village pond rehabilitation	1	Completed
	Channels	2	Completed
	Pond inlet channel	1	Completed
	Pond outlet channel to Irumbai tank	1	Completed
	Irumbai tank outlet channel	1	Completed
	Check dam near the Pond	1	Completed
	Check dam across the Irumbai outlet channel	1	Completed
	Check dam across the Canyon channel	1	Completed
	Repairing Check dam across the Canyon channel	1	
	Roof rain water harvesting	51	Completed
	Street Drainage		Completed
	Foot path across the canyon	1	Completed
	Foot path across the colony channel	1	Completed
	Tree plantation	750	completed
4	Solid waste management		
	Installation of additional bin	11	Completed
	Construction of vermi units	2	Completed
	Composting of degradable waste	2	Completed
	Installation of individual vermi units	50	Completed
5	Purification unit for drinking water	2	
	Material arrangements	2	Completed
	Site selection	1	Completed

Water Recharge program

Rain Water Harvesting

The main functions of rain water harvesting is to Storage the surface runoff rain water in some water harvesting structures such as check dams, percolation tank, sunken pit, trench pit and ponds for percolation and recharge in to the sub soil zone and harvesting from the roof of house which is collected to the pit and allowed to recharge and reuse the drinking water, when water scarcity.

Roof water harvesting is one of the techniques to augment ground water recharge. Rain water can be collected from roof through drain pipes and let in to the infiltration basin or filter basins constructed for the purpose and allow it to infiltrate in to the soil. There is every possibility to increase the ground water potential by harvesting rain water from roofs in kottakarai. In Kottakarai, The main objective of the roof rain water harvesting is to increasing the ground water recharge.

The suitable houses were selected based upon the criteria of construction of recharge sunk. Listed the beneficiary including common places like school, Temple, Health center arranged the needed materials and commenced to start the construction of recharge box. The beneficiary lists are tabulated in table.

Methodology of Implementation of RWRH:

- Selection of suitable houses for rain water harvesting.
- Selection of the location for constructing the recharge pits which are much closed to the garden.
- Prepare the design of the pit based on the roof area
- Collecting materials and constructing the pit
- Design Pipe materials to connect roof and the recharging pit based on the wall height of the house
- Plumbing works
- Design slab for covering the pit.

From the above methodology first the roof area can be calculated as listed in table-4

SI.No	Beneficiary	Length	Width	Total area in sq.mt
1	Night school	12.65	5.50	69.58
2	School	12.00	7.50	90.00
3	Cruch school	14.00	7.50	105.00
4	Mani	6.05	7.00	42.35
5	Palani	7.50	7.50	56.25
6	Hospital	7.00	5.50	38.50
7	Temple	10.50	3.50	36.75
8	Krishahan	10.00	4.00	40.00
9	Maheswari	7.50	4.00	30.00
10	Ariyaputhari	7.50	7.00	52.50
11	Siva	7.50	5.00	37.50
12	Murugaiyan	10.00	6.00	60.00
13	Vinayagam	6.00	6.50	39.00
14	Sethu	6.50	8.00	52.00
15	Sakhti	8.00	7.50	60.00
16	Jayamoorhty	7.00	8.00	59.00
17	Boobalan	12.00	7.50	90.00

18	Danasekara	10.00	6.00	60.00
19	Talaivar	10.00	8.00	80.00
20	Kolanji	8.00	7.50	60.00
21	Pavadai	8.00	6.00	48.00
22	Murugan	6.50	6.00	39.00
23	Kaliyappan	8.00	7.50	60.00
24	Muthulingam	11.00	8.00	88.00
25	Elumalai / Mari	7.00	7.00	49.00
26	Selvakumar	6.50	6.00	39.00
27	Ranganathan	7.50	7.20	54.00
28	Velayutham	8.00	9.20	73.60
29	Ramachandran	8.00	6.10	48.80
30	Rajeswaran	7.80	5.30	41.34
31	Sagadevan	8.30	8.30	68.89
32	Jayamoorhty	7.00	6.50	45.50
33	Sathiya	8.30	6.80	56.44
34	Meena	7.45	7.50	55.88
35	Iyyanar	7.00	6.00	42.00
36	Kandan	7.00	6.50	45.50
37	Karuppan	6.70	8.35	55.95
38	Selvaraj	7.70	6.50	50.05
39	Veerappan	6.00	8.30	49.80
40	Murugan	8.30	6.30	52.29
41	Thangaraj	7.00	7.70	53.90
42	Elumalai	8.90	5.50	48.95
43	Sekar	5.70	8.00	45.60
44	Murugiayan	5.80	6.20	35.96
45	Vazmuni	7.70	8.30	63.91
46	Parthiban	6.70	7.50	50.25
47	Venkatesh	5.90	7.00	41.30
48	Sekar	4.90	6.30	30.87
49	Natarajan	5.10	6.15	31.87
50	Kuthan	7.00	6.50	45.50
51	Vijaya Moorhty	7.00	8.30	58.10



Design the pit:

From the above table,

The Total rain water collected

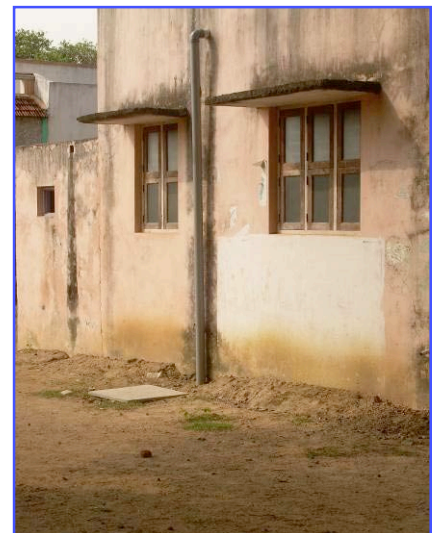
$$= 2727.68 \text{ sq.m}$$

The maximum area of roof top

$$= 105.00 \text{ sq.m}$$

The average rain water

$$\text{collected} = 54 \text{ sq.m}$$



For 200 sq.m of roof rain water collected in 6 cubic meter storage pit is the design

Generally for this village condition ,we consider roof area 100 sq.m.

For this 100sq.m roof water storage in to 3 cubic meter water sunk.

3 cubic meter box is enough to storage the roof water and lead to recharge.

But we had constructed the pit size of 2.0x2.0x1.20m by this 1.80cubic meter additional storage is done.

Design the pipes:

The height of the wall from the roof to the recharge pit is maximum 12 feet

3 inches PVC pipes of 4 Kg are enough to collect the rain water from the roof

Elbows are fixed depending design of the building.

Based upon these designs all the roof rain water harvesting structures were completed.

Recharge calculations

Total Area of the roof	:	2728 sq.m
Average rainfall in the area	:	1200 mm
Volume of water collected per annum:		2728 sq.mx1.2m
		3273.60cubic meter

Consider the evaporation loss 40% in RWH,

Then the volume collected per year: 1964.16 cubic meters

(1.4cubic meter water is enough to a one square meter family market garden.

1964.16 cubic meters would be enough to irrigate a family garden of an area of 1402 sq.m in a production of cycle of highly profitable crops.)

Operation and Maintenance:

Operation and maintenance of this system basically involve performing two main tasks:

Cleaning the roof at the beginning of each rainy season to remove any type of waste and foreign matter, usually by using the water from the first rains and cleaning the storage pit at the end of the rainy season. Both operations require a maximum of three days work per season.

Construction of Check dams:

Based on our proposal two check dam has been planned to construct in the village. Both the sites were identified one near the pond to help to fill the pond another across the surplus course of Irumbai tank help to recharge the overflow water. After altering the budget and got permission from you to utilize the amount of de-silting the second pond (which was done by Panchayat) to construct one Check dam across canyon and repairing another which is existing on same channel.

Check Dam – I (near the pond)

The construction of check dam near the pond has been completed and it has been properly served



for this purpose. The flow generated due to last precipitation has been properly diverted to pond. Now the pond is almost in fill position now.

Check Dam – II (Across the irumbai tank surplus channel)



The check dam – II has been properly constructed across the irumbai tank surplus channel. Usually it will be filled only during surplus of the tank, but it was filled by last rain on without surplus of the tank by the flow from settlements.



Check Dam across the Canyon Channel:

After finalizing the location of construction we make a catchment calculation based on Hydraulic particulars and defined the length, Height of the body wall, width of the solid apron, supporting type of the structure.

In transact walk and the people discussion about the path way which is connecting the village and Auroville across the stream. Heavy flow of the stream during rainy season it is very difficult to pass the odai. Lot of people particularly working people of Auroville utilized this way. The path way is situated at Center to the selected storage point by the Engineer and the existing broken check dam. The people suggested that the checkdam should construct in the footpath way act as dual. This recommendation is good but referring cost effective 1.60m height of checkdam is to be constructed in which the elevation level permits. In order to make the structure economical the height of body wall should be kept below 1.0m. The suggestion of the people involves the high cost by reducing this Engineering point of view, two separate structures to be constructed for the purpose of storage and footpath.

The length of the body wall is 9.0m has been provided. The free board of the earthen bank section is 1.0m. Careful consideration of this, checks the levels of full tank level and fixed 0.80m as the height of the body wall. Supported design was bell mouth type based on existing site conditions to match with the bund slopes. The existing check dam was collapsed due to poor construction and maintenance so that we are looking long sustainability decided coping concrete by using 20mm jelly for top portion of body wall with 20cm height. Planned to put rough stone dry



packing of the bund slopes to avoid ridges. This revetment is height is fixed above 10cm from Full tank level,

Before Full tank level (FTL) is fixed, existing check dam surplus level, adjoining patta level and all necessary levels were verified. Maximum water level is fixed 0.60m from FTL and the Tank bund is fixed 0.45m from the MWL.

After mental and physical preparation of all techniques pooja was conducted on 05.09.07. The methodology of implementation was discussed with VDC members on the same day. Construction was started as per standards of already mentioned above. This work was completed and the channel was filled during last rainfall.

The capacity of the storage is 1800 m³

That is 0.06 mcft, 0.15 acre.

Observations during rainfall:

After the construction the first surplus of the check dam is when the cumulative rainfall is 117.20 mm or 11.72cm. The second overflow of the check dam is when the cumulative rainfall is 66.20 mm The third one is 77.20mm rain fall. Interval of first and second surplus is one day and the second and third filling is 3 days.



The observations are tabulated as follow

Sl.no	Date	Rainfall in mm	Area in m ²	Height in m	Volume in m ³	Change in volume	Evaporation loss 20%	Recharge in m ³
1	21.10	10.6	2000	NS				
	22.10	26.8	2000	0.10	200	200	40.0	160.0
	23.10	65.4	2000	0.90	1800	SURPLUS		
	24.10	36.8	2000	0.80	1660	140.0	28.0	112.0
	25.10	62.4	2000	0.90	1800	SURPLUS		
	26.10	13.0	2000	0.85	1700	100.00	20.0	80.0
	27.10	15.6	2000	0.80	1660	40.0	8.0	32.0
	28.10	48.6	2000	0.90	1800	SURPLUS		

Total Rain fall: 279.20

No of fillings: 3

Total qty of water impounded at this stage: Capacity x no of fillings
1800x3
5400 m³

Total infiltration: 384.0m³

Average infiltration per filling: 128.0 m³

Expected Rainfall = Average annual rainfall- rainfall up to October
= 1200- 700
= 500mm

For above expected rainfall we may expect another 4 more fillings.

Repairing Check dam across the canyon channel:

The check dam which is in the same odai was repaired completely. The following table shows the repairing works which was done and the existing condition.

Sl.No	Existing condition	Works done
1	The body wall above the ground level was collapsed due to poor masonry works.	Dismantled the existing structure and reusing the existing rough stones
2	Concrete was not strength	Plain cement concrete 1:5:10 mortar using 40 mm hard broken stone has been done.
3	The supported apron was collapsed.	Talus is constructed to support the structure and the water surplus smoothly.
4.	Pointing mortar was very poor.	Plastering and pointing works with 1:4 cement mortars.



Before



After

Observations:

During the rainy season the upper level check dam is filled first and surplus. When the water surplus from the first one the Water level of the repaired checkdam is just 20 cm to overflow. The distance between the two check dams is 200m. From this observation we determined the water gradient that is 1:1000 slope. Due to this better slope for next two or three years the silt deposited will be in decimal.

Foot path

Two footpaths are constructed in this project. One is located at near Check Dam across the Canyon and the other one is in the colony. The purposes of these footpaths are mainly to cross the channels. In before during the rainy season the water flows in to the channel so that the people can't to cross the channel from one side to other. Both footpaths are not finished due to the resent heavy rain.

These works are designed in simple based on the budget providing RCC pipes with collar are laid and the soil was dumped on the pipes and connecting the two sides of the footpath. A supported random rubble masonry structure was constructed at the sides and top do the pipes. Side revetments and turfing with grass are also planned. The recent heavy rain was affected the ongoing work. The above pending works to be completed with in the first fortnight of November-2007.

Sanitation program

Eco- san toilet construction works were completed with proper white washing. We have planned to conduct one function with government official to hand over to beneficiary. In the mean time we have discussed with beneficiary about the system of usage and adoption.

We have planned to study the impact of eco-san in the basis of the project cost and the people contribution, the cost returns to them by using that manure and marketing. This impact results in the form of cost benefit ratio will describe in final report of this village. The cost benefit ratio is calculating by the following factors

- a) No of persons usage the Eco-san,
- b) The collecting quantity of eco-san manure after six months of usage which will be used for gardening
- c) Cost of the yield from the gardening plants.

Continuous motivation for usage of eco-san and observations are needed to sustain this activity regularly. People feel of insufficient ash may delay the usage system of toilets. This will be solved by giving manure instead of ash from the Vermi compost which is now planned to start through 50 beneficiaries in the solid waste management component.

The strategies of the operation and maintenance cost will be discussed in the committee meeting.

Before commencement of this eco-san there was 90% of accessibility for usage. Now we are in completion stage of construction. After that we will framed the monitoring tool of WH chart and get results from these charts will confirmed the usage of the system.

Solid waste management

Collection and separation process of Solid waste management in the village is continuously progress as per protocols framed already. September month we have utilized the school children by NSS camp which was combindly arranged by the village panchayat. Students, village youth members and the SHG group's together working for solid waste management in addition to labor. This group works were co-coordinated by us. The improvement of solid waste management increased from month to month. Particularly, the people doing the cleaning works by themselves shows the better performance of solid waste management which is in table-2. The bar chart also implicates the performance.

Month & Year	Cleaning by the labor wages –by the organization	People collection properly by themselves	Total solid waste management
Sep 2006	Inauguration and awareness	Existing condition	Pre project condition
Oct 2006	Dustbin arrangements	Awareness creation	started
Nov 2006	Labor involved in cleaning 60%	10%	70%
Dec 2006	60%	15%	75%
Jan 2007	60%	20%	80%

Feb 2007	60%	25%	85%
Mar 2007	60%	30%	90%
Apr 2007	60%	35%	95%
May 2007	55%	40%	95%
Jun 2007	45%	45%	90%
July 2007	40%	50%	90%
Aug 2007	40%	50%	90%
Sep 2007	20% collection through NSS camp	80%	100%
Oct 2007	20%	80%	100%

The table and the above charts are reflects the collection of data from weekly observations and the reports of the solid waste management labor. It is the correct stage for handed over the solid waste management to panchayat. For this we have to make clean protocols and will arrange a meeting for discussion with the panchayat president, Village development committee and solid waste management committee.

We think some strategies for the discussion such are

- Monitoring the SWM by the staff

- The operation & maintenance cost

- Salary for labor wages is maintained from the panchayat or the interest amount from the corpus fund is there, any possible.

Vermi -compost

The activity is composting the degradable waste through verms composting, for that we have constructed the vermi units in two places one near the dumping yard and another near the school premises. Further to expand this system at house hold levels identified the interest beneficiaries both in village and colony. We have planned to implement the activity for 50 beneficiaries, based on showing the interest initially we have selected for 35 beneficiaries and listed in table-3.

We have planned to provide the two cement rings of size 0.90m dia of one feet height, in which one is bottom molded and the other is opened. We have arranged a meeting for discussed with the beneficiaries about composting method of the vegetable wastes through vermi and marketing the manure and reusing. We assured the marketing facility for the beneficiaries. We focused this activity as income generation program to women self group members.

Purification unit for Drinking water

This activity will be started after completion of drinking water distribution network. Relate to installing the unit, site and other requirements are finalized in colony and it will be commenced on with in November 22nd 2007. There was a problem in finding the place for drinking water unit in the village and waiting for their decision.

School Program

Water testing campaign

Creating awareness to the school children we have bought the handy water testing kit from TWAD board from Chennai. We have given the training to the student for using the system. The following parameter has been tested at seventy five percent accuracy levels.

- ❖ Total hardness
- ❖ Calcium
- ❖ Magnesium
- ❖ TDS
- ❖ Sulphur
- ❖ Iron
- ❖ Fluoride

Developed the student standard to testing the water individually and planned to test the water at three levels,

- ❖ Local drinking water testing
- ❖ Tank water testing
- ❖ River water testing

Local water testing:

We have arranged the village level campaign for testing all the source of drinking water in village. For that students were collected all the water samples and each one was tested one parameter.

Tank and River water testing:



Suitable site has been selected to test the tank and river water, which were Osteri and Chunnambar.

Then we have arranged the exposure visit to student for this place with proper planning. Main



aim of the program is to creating awareness to student about the Tank and river water quality. Students of around thirty number were visited the place and properly tested one water sample on the bund of tank and another at the riveside.

School project development – II – Student Village campaign:

- ❖ Arranging Student campaign through National Service Scheme
- ❖ Student campaign activity
- ❖ Student campaign Inauguration
- ❖ Activity details
- ❖ Campaign closing ceremony

Every year at the end of September the National service scheme is conducted by the schools which are selected by the concerned departments. That selected school officials decide the villages for service. For that we have contact the Gandhi higher secondary school (which is 2 kms from the Kottakarai village) official for call for to select our project village for the same. Based on our demand they have selected our project village kottakarai for above said service. This camp comprises of the students those are higher secondary level.

We have combindly arranged the program with village panchayat of Kottakarai. Duration of the program is ten days and participant's strength is 30 students, 7 local youth members and 4 teachers. Main objective of the program is to create the awareness relates to health, water, sanitation and physical activities like cleaning the village surroundings, conducting the health camp and tree plantation. We, the association of village development council and the co-coordinator of NSS camp joint together put schedule of following 10 days program.

The schedule of the NSS programme:

Date	Activity/awareness programmes	Participants/Resource persons
24.09.07	Inauguration	Mr.Gill, Education department, Association
	About Psychology	School official
25.09.07	Cleaning Mariamman koil ,Kottakarai	staffs, SHG, Youth, Students
	Students and their rule	Buvaneshwar, Social organiser, Harvest
26.09.07	Cleaning Pilliyar koil street	Students
	Film Education of HIV and TB	Hemrix Rural Center.
27.09.07	Cleaning Bharathipuram	Students, association, staffs
	About Gender	Judith. Project co-ordinator, Harvest
28.09.07	excavating pits for recharge	Students, staffs
	Yoga training	School Teacher
29.09.07	Cleaning school and common places.	Students
	Solide waste management	Elavarasan. Social organiser, Harvest
30.09.07	Cleaning colony	Students
	Sports activity	Students
01.10.07	Cleaning road and dumping collection	Students
	Importance of water	Dhandapani, Team leader, Harvest
02.10.07	Plantation	Gills, SHG, Youth, Staffs, Association, Teachers
03.10.07	Closing ceremony	Govt officials, Harvest staffs, Association



Mr. Gilles Boulicot, the Executive director of Harvest lightened the lamp and started the camp. The NSS camp coordinator was explained the activities of camp. The association leader and some Executive members were special addressed

This ten days programme makes a sprit to the association and ends with a function and summarizing the feedback of this program.

Output from NSS Program:

- All the streets are cleaned and dumped the wastes in proper dustbins
- All the Wastes of the dustbins are dumped in the yard.
- Gender Sensitization
- Awareness on water scarcity
- Plantation resulting good survival
- Students knew the importance of NGO

On closing ceremony, we were arranged a exhibition about the activities of the NSS camp. Proper place has been arranged for feasible to show all the clips of the NSS activity. We have displayed the entire event conducted in the school including the awareness campaign, Solid waste management, Plantation. The village people particularly SHG and Youth have been actively participated in the programme. At the end of the programme the school authorities had given a certificate for Harvest and gave the momentum.



Tree Plantation

We conducted tree plantation on oct 2nd the national day . In tree plantation all NSS students, SHG groups, village youth, the executive director of water harvest auroville, the village development executive members were participated. Before plantation the methodology has been followed and the samples are collected.

Methodology for Tree plantation:

- Design the spacing, fencing
- Compost arrangements
- Discussion with village committee
- Selection of places
- Watering
- Documentation
- Prepare a memorandum for NRM

We have selected the places for plantations are two ponds and three channels. We have planted spacing of 6.0m between two plants. Pit size for excavation of the soil is 0.45x0.45x0.45 m. We formed six groups and each group planted in one place. Before plantation we instructed the following to each group

- Don't plant on the top of the bund
- For channels, the plants planted on upstream side of the bund
- In down side alternative rows were planted.
- Do not planted under or near to the trees
- Do not plant on the shadows.

We planted 750 no of plants in 20 varieties such as Mango, Tamarind, Kadal thiratchai, Pinnai, Pala, Nelli, Navel, Makizam, Patham, Neer kadambai, Vaagai, Santhana vengai, Poovarasu, Gaya, Kattu elumitchai, Vembu, Poongam..

The impacts of plantation are, Reduction in wind velocity resulting in the arrest of movements of sand and soil particles. It also help to prevent the soil erosions, Protection of live stock, Strengthening the bund and income generation.

From the plantation, some trees are generated income. We make a strong strategy for sharing the income from trees between Village panchayat, SHG and the village committee. SHG take part for watering to plants in alternative days. Till there is 95% good survival results in the plantation. The importance of the tree planting can be realized when we notice that the ground water recharge on account of these vegetative measures would increase as much as, or even more than all the other engineering works put together.

1. Solid waste management

Installation of dust bins

Total no of dust bins = 32 nos

In which fiber is 18 nos

These 32 no of dust bins are served for entire population of Kottakarai village, Bharathipuram and colony.

Total house hold = 327 nos

Total families = 419 nos

Total 32 dist bins covering 327 House holds both colony and the village.

Pre project condition (Kottakarai)

- Dumping waste near the house : 29%
- Dumping waste common place : 23%
- Dumping waste at street dust bins: 48 %(only 3)

On stage: (Kottakarai)

Cleanliness ratio (Compared between the pre and ongoing in dumping the waste near the house)

No one dumping the wastes near the house and it is now 100%. Increasing the ratio is 81% comparatively the previous.

Cleanliness ratio (Compared between the pre and ongoing in dumping the waste common place)

Dumping the wastes in common place is now 20 houses at colony even there is a dustbin there. Approximate 100 persons not care taken in solid waste management. This is 100 out of total population of 1800 nos. that is 5.55% of the people is dumping the wastes at the common instead of dustbins. This ratio is reduced 5.55 from 23% of the pre project

Cleanliness ratio (Compared between the pre and ongoing in dumping the waste into dustbins)

Dumping wastes in to the street dustbins 90% of the people involved properly in the solid waste management. Population, 1600 beneficiaries are directed benefit through this component.

Cleanliness ratio in pre project: 48%

Cleanliness ratio on project: 90%

Cleanliness ratio (Compared between the dustbin & families)

Total no of 1800 persons utilized 32 dustbins that is average 56 persons used one dustbins that is average 4 persons take from a house is gives the 14 houses. So, one dust bin filled 15days by those 14 houses. Based on this the association decided to clear the wastes by twice per month.

Cleanliness ratio in pre project: 1:276(678 persons only using three dustbins)

Cleanliness ration on project: 1: 56 (one dustbin for 56 persons)

On status:

After completed this activity through Aqua for all we asked to the village president to handle this solid waste management program. Panchayat president agreed to clean the solid wastes for one year. After one year they have to collect some money may be Rs 10 or Rs 15 from individual house. From that amount they would maintain this program. Last six months the village Panchayat done successfully. But recent three months they did not take the solid management due to the following reasons.

- The labor who involved in this program is in bad health due to over drinking and he is not came to clean the solids. No other people is not come forward to do this work. Labor scarcity is the main reason.

- The cycle was repaired. They have to look Harvest. How Harvest helped continuously? So I asked the Panchayat to make repair that cycle.

Totally it is successful program. President assured this year to operate this program continuously.

Note: For this we have to discussion with Panchayat president

Now a day's Solid waste management is the key program for rural development by Govt of Tamilnadu. They give project for this program in some village but not give regular fund to all the villages.

2. Sanitation

In aqua for all Sanitation comprise three sub components

- a) Common toilets
- b) Ecosan Toilet construction
- c) Grey water treatment (model)

A) Common toilets

We renovated three common toilets. We don't have exact figures of beneficiaries who are using the common toilets.

- 10% population using Bharathipuram common toilet
- Maximum persons are used school toilets
- At colony, it is not functioned properly because of the maintenance.

B) Ecosan toilets

Initially harvest did sanitation awareness programs and renovation of common toilets. But no one maintain the common toilet and not forward to use the common toilets. They don't change their traditional things. **Also Govt total sanitation program is failure.** Gill considering these two factors he wanted to implement the dry type toilets that is ecosan.

Why we chosen the Ecosan

- Restores human dignity to the people who are forced to adopt open defecation
- Prevents pathogens in human waste contaminating thr water resource
- Does not use the water as a carrier to dispose off human waste and hence conserves precious water
- Maintenance easy and Ecofriendly
- No need for de-sludging or pumping out black water as in the case of septic tanks
- Ecosan systems are managed on household or community level and hence is less expensive and do not require investment in large –scale infrastructure as in the case of centralized underground drainage.
- No need to dig pits. No need for sewers or treatment pipes
- No need for external infrastructure
- Safe and affordable for users in water logging and water scarcity areas
- No pollution of ground water or soil
- Hazard of water source contamination by discharging septic tank black water by tankers avoided
- No flies or pour smell
- No mosquito breeding as there is no water stagnation
- Minimal use of water than other toilet models
- Enables use in an environmentally friendly manner- compost and urine
- Recycling of human waste improves soil fertility
- The compost increases soil productivity

- Reduces expenditure on chemical fertilizers and pollution caused by them

Implementation

Initially this program was planned to construct 60no of ecosan at Kottakarai. After constructed 60 nos people are eager to construct ecosan more and asked additional 25 nos to Gill. Gill agreed another 25 nos and balanced the fund from Ensemble for the additional activities. Total no 85 nos were constructed.

Contribution Details

Total no of ecosan construction = 85 nos

Total contribution = $85 \times 1500 = 127500$

So far collected = Rs 60000

To be collected = Rs 67500

Govt Contribution to be collected = $85 \times 2400 = 204000$

On status

Lot of awareness was given to the people for the usage of ecosan.

Before the project awareness programs for sanitation through UNESCO at Kottakarai was given by Harvest for One year. After we gave lot of Education to them through

- Exposure visit ecosan toilets constructed by SCOPE at Sunami affected area
- Successful stories of ecosan video programs broadcasted in the village and colony
- Wh chart is prepared by me and make questionnaire. To find out the users.

During evaluation the evaluator found some of them using the toilet and reported in good view regarding the sanitation. Also gills asked me the report for funding agency. Based on the questionnaire and the evaluation report I indicate that 90% of people using the toilet.

Recently I and talloc made a visit to ECOSAN at Kottakarai and some other Ensemble villages. We found only few of them using the toilet at Kottakarai and 50% using at Ensemble villages.

Unit cost of Ecosan

Unit expenditure	=	$(85 \times 12000) / 340$ Rs 3000
Unit contribution	=	$(1500 \times 85) / 340$ Rs 375
Govt contribution	=	$(2400 \times 85) / 340$ = Rs 600
Unit project cost	=	$3000 - (375 + 600)$ Rs.2025

Note: Why I subjected to this unit cost of ecosan it will help to make protocol for the next phase

Cost Benefit (Harvest fund)

We spent Rs 2000 per head for the ecosan at Kottakarai. If the program is survival Rs 2000 is the reasonable amount to spend. But if it is failure like Kottakarai it will be waste to spend money in the project. So we have to make strong strategy whether we continue this type or gone to flush type toilets.

Internal return ratio (IRR-People)

If the people use properly they got good cost benefit ratio.

One time investment Rs 375 per head

Each house has average four persons

So one family investment Rs 1500 at one time (Including govt)

Each house got two times manure. (Six months once)

The size of the storage unit = 0.4cubic meter

It would be approximately 500kg

Per Kilogram the cost of price is 50paise

For 500Kg it would be Rupees 250.

Per year, one house earning Rs 500.

The Next YEAR they get return backs their money and also the health is sustained.

Cost benefit (People fund)

Life of ecosan is minimum 10 years

Total earning in ten years will be 5000.

So the cost benefit ratio is 1500:5000

The cost benefit ratio is 1:3.3

It is good ratio. We should give in this view and educate them.

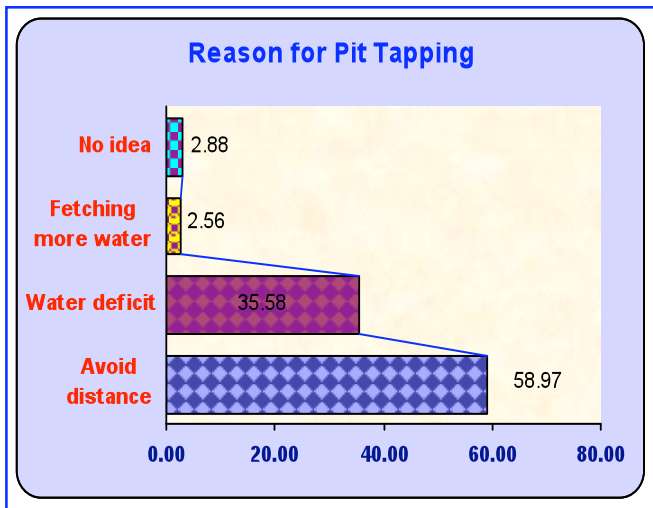
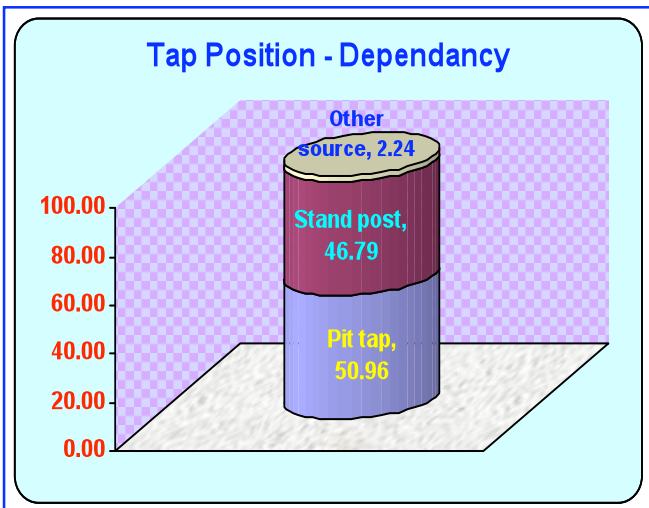
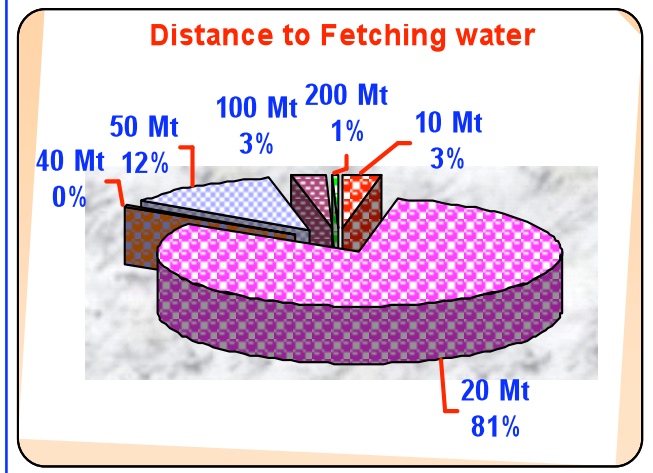
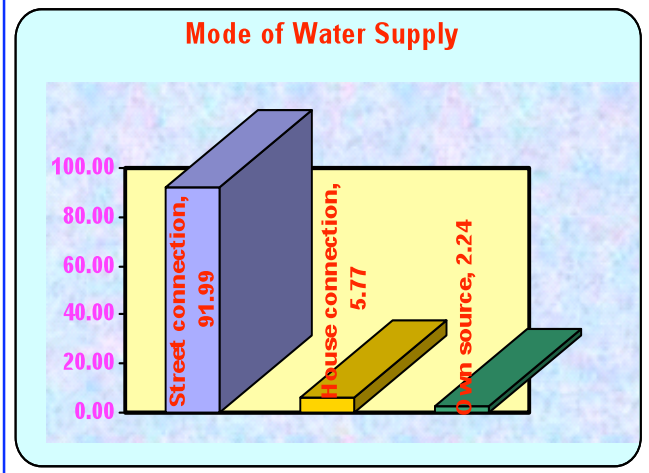
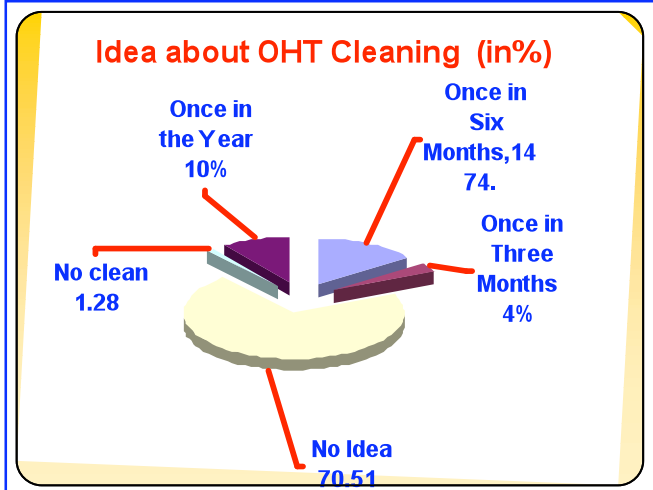
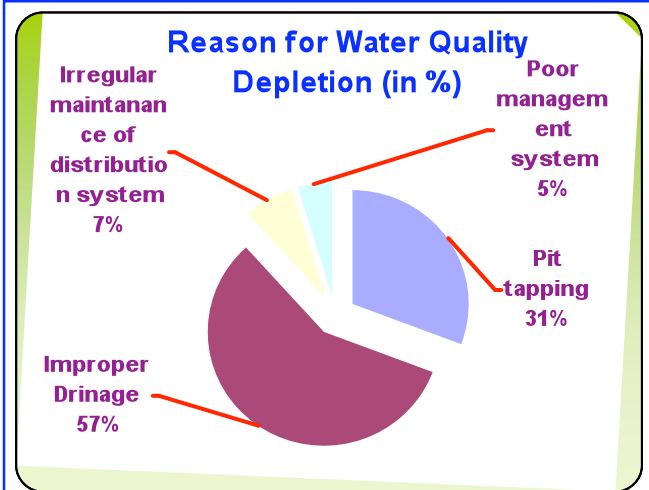
C) Grey water treatment

Gill asked me to construct minimum 10 nos of Grey water treatment at Kottakarai as a model for the next phase. I was limited 5 nos for the following reasons

- No proper gardening and infrastructure houses in the Kottakarai
- No equal representation. No suitable house at colony to construct grey water model.

3. Water Supply (House hold level)

The below charts shows the Existing condition of Kottakarai Water supply



There are three Over Head Tanks.

1. Kottkarai village water supply
2. Bharathipuram Water supply
3. Colony water supply

Kottakarai village water supply

It is the successful program after facing lot of problems and step by step we overcoming this issues and had succeed.

Initially Gills and Dhandu planned to connect the supply for 80 no of houses at the village. The connections were extended to 106. This is we doing additional work apart from the planned budget.

After checking water supply we started the supply system. Initially one month this program is going on smoothly. After that some persons in the village used the supply water ill legally. They removed the tap and connected the hose to the tap and used the water for their personal construction and used more water than allotted. The women group complained me and immediately I made weld on the tap and put concrete on the bottom of the stand post.

Temporarily it was stopped. But again the people broken the weld and used the water in same way. I asked the women to identify those people. One Sunday nearly 15 women made walk through survey and investigated 10 people who are doing the dishonor activity. Then they moved to the Police station and complained them. Immediately the department of Police called those people and warning them. Noe the program is going smoothly.

Total no of Individual connections = 102

Total no of street taps = 19

Model Analyzing water supply at Kottakarai

Total no of houses supplied = 135 nos (existing)

Now, Total no of 102 house holds benefited and 402 no persons are benefited.

No of street taps provided of 20 at kottakarai

These 19 streets tap covering 110 beneficiaries.

Totally 512 beneficiaries are covered from this water supply.'

Design safe?

Total capacity = 30000 liters

No of filling = 2 times (Morning & evening)

Total = 60000 liters

This 60000 liters utilized by 512 beneficiaries

So per capita utilized = $60000/512$

$$= 117.875$$

Say = 120 liters / day

Hence the design is safe

The time taken 2 hours in summer

In winter it is differ.

Comparison

Description	Pre project	Present
through street connection	91.59%	25.92%
house connection	5.77%	90.30%
other source	2.24	2.24%
Difficulties in fetching	81%	7.46%

2. Bharathipuram Water supply:

It was completed and most successful program at Bharathipuram. Even a single problem not comes there.

Total no of connections = 56

Total no of street taps = 13

3. Colony water supply:

All the connections were completed. After pongal the delivery will be commenced.

Total no of connections =66 house holds

Total no of street taps = 11 (two to be installed)

4. Water Resource Management

A. Impacts of Water recharge programs:

A4A is a short term project. So the impacts of the activities particularly water recharge programs are obtained in only micro level. Some of the impacts are given based on the observations and conducted post survey of the activities.

- Structures are improved by restructuring with appropriate levels
- Nearly 550m length of feeder channels have been desilted and improving the free flow and make jungle clearance.
 - Ganesh bakery-150m
 - Colony channel-150m
 - Pond channel - 250m
- Improving the village pond capacity: 4680cubic meter volume is increased by desilting the village pond thus by increasing the storage capacity is 0.17 mcft of water.
- This 0.17 mcft increased water in agricultural view, an equal to one irrigation for 10 acres.
- The surrounding wells definitely having good water table in an around the village by desilting pond, desilting channels, storage the water by constructing check dams at across the channels and Rain roof water harvesting
- Continuous three months observations at the pond there is 4000 cubic meter water recharge in to the ground which is calculated based on the data collection of volume and evaporation.
- Hydraulic particulars of such structures are maintained (Full tank level)
- Through all the check dams from one week observations during rainfall averagely 128 cubic meters recharge in to the ground.
- In the series of check dams from the observations we have find that the height difference between the ganesh bakkery and the second one is 20cm at a distance of 200m. From this specification we determined the slope of the water gradient is 1:1000 slopes. Due to this better slope the silt deposit will be minimum for next Two or Three years

Abstract for water resource programs

Total channel clearance = 550 meter

Total no of checkdams constructed = 2 nos (One at Ganesh Bakkery and another at colony)

Total no of Foot paths = 3 nos(One at Ganesh Bakkery, Next one is at Colony and third one is for Aurollio's place)

Total no of Ponds = 1 (at village)

Total no of weir cum checkdam = 1

Total no of Repaired checkdams = 1

On status

Only the colony checkdam was eroded due to recent heavy rain. Others are o.k

B. Roof rain water saving

We constructed in 51 no houses at Kottakarai.

The main objective is to recharge the rain water in to the aquifer not reused.

Phase-1: Impact calculations

Total Area of the roof: 2728sq.m

Average rainfall in the area: 1200 mm

Volume of water collected per annum: 2728 sq.mx1.2m

3273.60cubic meter

Consider the evaporation loss 40% in RWH,

Then the volume collected per year: 1964.16 cubic meters

(For one square meter garden 1.4cubic meter water is enough to a family market garden.)

This volume would be enough to irrigate a family garden of an area of 1402 sq.m in a production of cycle of highly profitable crops.

5 Drinking water

There are Two Drinking water units. One at Colony and another one is at Village.

On status:

Construction was completed

Electrician works were completed

Sump works were completed

Pending activities

Before one month the strategy was framed like Sanjeevi nagar. The entire women group was very interested to buy the bubble taps. But there is conflict between women and the association president. Still it continues. So I arranged re strategy to manage conflict and called a meeting for women after Pongal.

After meeting we will check the Aqua dune system and to start the distribution in the end of month



6. School Activities

The following exposure visits were arranged for the school students. Our main Objective is to give awareness about the water and environmental to the students.

SN	Places of visit	Purpose of visit
1	Vedanthangal	Tank acted as a shelter
2	Madhurandhagam	Big tank
3	Mahabhalipuram	Sea water intrusion
4	Kunimedu tank	Small tank

Drawing competition

We were conducted the Drawing competition for the school students regarding water and sanitation.



Exhibition

We have conducted the school exhibition about the first phase of the project completion activity. Proper place has been arranged for feasible to show all the clips of the project activity. We have displayed the model of the entire event conducted in the school including the awareness campaign, quiz competition, drawing competition, Exposure visit. Students and parents have been actively participated in the event.

Second Exposure Visit

The exposure visit for the school student has been planned with the authorities of the school and selected 30 no of students. We took tutorial for the students about the water quality and testing methods. For this we selected and arranged the visit to usteri for water testing and Puduchery boat house for entertainment.

Water testing campaign

- ❖ Local drinking water testing
- ❖ Tank water testing
- ❖ River water testing

School project development – II

- ❖ Arranging Student campaign through NSS
- ❖ Student campaign activity
- ❖ Student campaign Inauguration
- ❖ Activity details
- ❖ Campaign closing ceremony

Every year at the end of September the National service scheme (NSS) is conducted by the schools which are selected by the concerned departments. Thirucitrambalam Gandhi higher secondary school which is 2 kms from the Kottakarai village was selected our project village for the same. Higher secondary level students were participated in this program.

We, the Panchayat and NSS camp coordinator jointly make this program for 10 days programme.

Output for NSS

- All the streets are cleaned and dumped the wastes in proper dustbins
- All the Wastes of the dustbins are dumped in the yard.
- Gender Awareness
- Awareness on water scarcity
- Plantation resulting good survival
- Students knew the importance of NGO

On closing ceremony, we ware arranged a exhibition about the activities of the NSS camp. Proper place has been arranged for feasible to show all the clips of the NSS activity. We have displayed the entire event conducted in the school including the

awareness campaign, Solid waste management, Plantation. The village people particularly SHG and Youth have been actively participated in the programme. At the end of the programme the school authorities had given a certificate for Harvest and gave the momentum.

Kitchen Garden

We implemented one kitchen garden at inside the school and maintaining the vegetables by school servant and by using the income from the kitchen garden to develop the school children activities such as sports, prizes and environmental primary teaching and so on.

Size of the Kitchen Garden= 20x30 sq feet

Vegetables planned to plant: Tomato. Brinjal. Chilly, Ladies finger, Bitter guard, Pumpkin, Snake guard, Bottle guard, Cluster beans, Beans and some greens varieties.

Maintenance of Kitchen garden:

For maintaining the kitchen garden is very important. Fencing is to be provided and watering for plants is regular work. So we give honorarium to the existing school servant for doing this regular work decided up to three months of 300 per month.

On status:

Once we stopped the honorarium the maintenance of the kitchen garden is little bit poor.

7. Income generation programs

- i) Vermi compost (Individual)
- ii) Aquaculture (common)
- iii) Plantation

i) Individual vermi compost

After construction on two vermi units in the village creating interest to the individuals and they are interested at vermi compost as income generation by doing individual activity. We selected fifty beneficiaries through the association office bearers and finalized.

We were provide two cement rings of size 0.90m dia of one feet height, in which one is bottom molded and the other is opened. We have arranged a meeting for discussed with the beneficiaries about composting method of the vegetable wastes through vermi and marketing the manure and reusing. We assured the marketing facility for the beneficiaries. We focused this activity as income generation program.

Procedures:

- ✓ Procedure manual preparation in Tamil
- ✓ Explain in the meeting
- ✓ Purchasing the verms
- ✓ Link aging the beneficiaries with market people

Expenditure Cost for one beneficiary by the project:

Bottom cement ring:	Rs 340.00
Open cement ring:	Rs 170.00
Transport:	Rs 80.00
Vermis:	Rs 150.00(0.5Kg)
Marketing expensive:	Rs 150.00
Total expensive	Rs 890.00



Production (Per year)

Dia of cement rings:	0.90cm
Height of the rings:	0.60cm
Volume of the rings:	0.38cubic meter say 0.40cubic meter

Expected volume of the compost collected from one beneficiary: 80% of the volume of the rings. So the production is 0.30 cubic meter per beneficiary. Next six months it will become double. So total production of the compost per year is nearly 0.60 cubic meters per house

Market rate: 3000/ton (that is 1000kg)

For 0.60 cubic meter production of compost will sale at the cost of Rs4320.00

Estimated Cost benefit ratio:

Project cost:	Rs 890.00
Production cost:	Rs 2592.00
Profit cost:	Rs 1702.00

**Cost benefit ratio = Project cost: Production cost
= 890:1702**

**The Ratio of the cost benefit is 1:2.01
The profit is more than two times of project cost return
to the people in one year. It is good income generation
programme.**

It is a very good program. But I could not follow this program because there are no supporting staffs. I and Toby decided to relieve staffs from June 08 due to the insufficiency of fund and delayed the next project approval. Anyway some villagers are used to their field. On the Farmers day the president of the Kottakarai was presented in her speech.

Note: We need more concentration at Edayanchavadi

ii) Aqua Culture:

This program was postponed the following reasons:

First the water storage decreased and not enough water to get more yield. Second thing the silt is not clear because this year only desilted the pond. Next year the silt will be deposited and good for yield. So next year on the rainy season we have to start the aqua culture by following methodology

- First call concern department and selected the fingerlings based upon the water quality, storage period and the soil with the guide lines of fisheries department
- Creating marketing sources at higher rate
- To keep the fish in the water at the rainy season when the pond will be filled by making net before the outlet channel
- Appoint one person for salary to maintain the pond at the period of three months.
- Pre calculation towards the benefits depends upon the variety of fishes.

III) Plantation

We conducted tree plantation on oct 2nd the day of national (Gandhi birth date. In tree plantation all NSS students, SHG groups, village youth, the executive director of water harvest auroville, the village development executive members were participated. Before plantation the methodology has been followed and the samples are collected.

Methodology for Tree plantation:

- Design the spacing, fencing
- Compost arrangements
- Discussion with village committee
- Selection of places
- Watering
- cementation
- Prepare a memorandum for NRM

We have selected the places for plantations are two ponds and three channels. We have planted spacing of 6.0m between two plants. Pit size for excavation of the soil is 0.45x0.45x0.45 m. We formed six groups and each group planted in one place. Before plantation we instructed the following to each group

- Don't plant on the top of the bund
- For channels, the plants planted on upstream side of the bund
- In down side alternative rows were planted.
- Do not planted under or near to the trees
- Do not plant on the shadows.

We planted 750 no of plants in 20 varieties such as Mango, Tamarind, Kadal thiratchai, Pinnai, Pala, Nelli, Navel, Makizam, Patham, Neer kadambai, Vaagai, Santhana vengai, Poovarasu, Gaya, Kattu elumitchai, Vembu, Poongam.

Impacts

The impacts of plantation are,

- ❖ Reduction in wind velocity resulting in the arrest of movements of sand and soil particles.
- ❖ It also helps to prevent the soil erosions, Protection of live stock, Strengthening the bund and income generation.
- ❖ Income generation is common for village
- ❖ Creating environment factors

Abstract of this component

No of individual vermi compost = 50Nos

No of common model vermi compost = 2nos

No of Plantation = 75 Nos

`Survival of plantation = 50% of activity